



E-CA NO : CA-2023-021005

E-FILING NO : EF-HCK-2023-049991

BEFORE THE HONOURABLE HIGH COURT OF KERALA AT ERNAKULAM

_____ Of Year 2023

In

WP(C) No.19992/2023

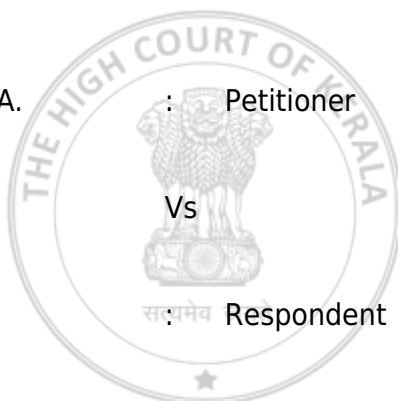
V.D. SATHEESHAN M.L.A.

: Petitioner

Vs

STATE OF KERALA

सःयमेव Respondent



COUNTER AFFIDAVIT FILED BY 6TH RESPONDENT

VAKALATH FILED

NOTICE RECEIVED O 14/7/23

Sd/-
E-VERIFIED
M.A.ZOHRA
K/441/1984



BEFORE THE HONOURABLE HIGH COURT OF KERALA AT ERNAKULAM

_____ Of Year 2023

In

WP(C) No.19992/2023

V.D. SATHEESHAN M.L.A. : Petitioner

V/S

STATE OF KERALA : Respondent

INDEX

SL	Contents	Page Nos
1	counter affidavit : counter affidavit	1-26
2	EXHIBIT R6(a) : A true copy of the project proposal for Advanced Automated Traffic Enforcement System based on boot model for 5 years and facility management services for 5 years under the Safe Kerala Project dated 22.08.2019 submitted by KELTRON to the Motor Vehicles Department	27-135
3	EXHIBIT R6(b) : A true copy of the Government Order constituting the High Level Committee dated 17.12.2019	136-136
4	EXHIBIT R6(c) : A true copy of the minutes of the meeting of the High Level Committee dated 28.12.2019	137-140
5	EXHIBIT R6(d) : A true copy of Government Order GO RT No: 134/2020/TRANS granting administrative sanction for the project on 27.04.2020	141-142
6	EXHIBIT R6(e) : A true copy of the Work Order issued to KELTRON by the Transport Commissioner dated 14.05.2020	143-144
7	EXHIBIT R6(f) : A true copy of the service level agreement executed between Respondents 5 and 6 dated 28.05.2020	145-168
8	EXHIBIT R6(g) : A true copy of the purchase order details of the Safe Kerala Project	169-192
9	EXHIBIT R6(h) : A true copy of e-Tender KSEDC/KCC/CPG/ENQ/0041/20-21 dated 26.06.2020	193-290
10	EXHIBIT R6(i) : A true copy of the Letter of Intent dated 11.09.2020 issued by KELTRON to M/s SRIT India Private Limited	291-291
11	EXHIBIT R6(j) : A true copy of letter KCC/CPG/G36/2022-23/687 dated 30.06.2022 sent by KELTRON to the Motor Vehicles Department, Government of Kerala	292-297
12	EXHIBIT R6(k) : A true copy of the detailed worksheet on 5 year BOOT model (5 years + 11/2 years)	298-311

Sd/-
E-VERIFIED

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**BEFORE THE HONOURABLE HIGH COURT OF KERALA
AT ERNAKULAM**

WRIT PETITION (CIVIL) No 19992 OF 2023

VD Satheeshan MLA and another Petitioners

vs

State of Kerala and others Respondents

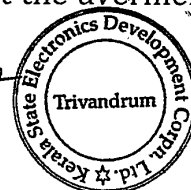
**COUNTER AFFIDAVIT FILED BY THE 6TH RESPONDENT IN THE
ABOVE MATTER**

I, N Narayanamoorthy, aged 72 years, S/o Nilakanta Iyer, Chairman and Managing Director of the Kerala State Electronics Development Corporation Limited (KELTRON), Keltron House, Vellayambalam, Thiruvananthapuram 695 033, do hereby solemnly affirm and state as follows:

1. I am the 6th respondent in the above Writ Petition, and I am filing this counter affidavit on behalf of the Kerala State Electronics Development Corporation Limited. I am conversant with the facts of the above Writ Petition.
2. It is respectfully submitted that the above Writ Petition is not maintainable in law and facts and is devoid of merits and bonafides and hence liable to be dismissed. The various contentions set forth in the Writ Petition are not correct and hence denied except those contentions that are specifically admitted hereunder.
3. It is respectfully submitted that the contentions set forth in paragraph 1 of the Writ Petition are correct, but the averments set



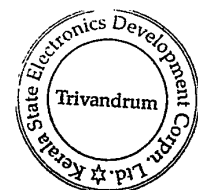
N. NARAYANA MOORTHY
Chairman & Managing Director



forth from paragraph 2 onwards of the Writ Petition are denied to the extent of allegations made against this respondent who is a Government Company owned by the Government of Kerala and a Public Sector Undertaking of the State Government and bound by the directives of the government since its formation and has not committed any illegalities or corruption attached to the installation of Artificial Intelligence (AI) Camera as alleged in various paragraphs of the Writ Petition; neither has it created any nepotism, favouritism, or corruption or has done anything in violation of privacy as envisaged by the Honourable Apex Court in the judgment rendered in *KS Puttaswamy v Union of India*, (2017) 10 SCC 1. As such, the contentions aimed to be put forth in paragraphs 2 and 3 are not correct for the reason that KELTRON has submitted only one project proposal with detailed project report (DPR) to the 5th Respondent on behalf of the Motor Vehicles Department, Government of Kerala (MVD) on 22.08.2019 clearly setting forth all aspects of the project including the payment condition with five years boot and twenty equal quarterly payments of Rs 11,79,11,440 (eleven crore, seventy-nine lakh, eleven thousand, four hundred, and forty rupees) with GST at the rate of 18% and cess at the rate of 1%. A true copy of the project proposal for Advanced Automated Traffic Enforcement System based on boot model for 5 years and facility management services for 5 years under the Safe Kerala Project dated 22.08.2019 submitted by KELTRON to the Motor Vehicles Department is submitted herewith to be marked as **Exhibit R6(a)**. Part A is the




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Technical Proposal and part B is the Commercial Proposal. Part B at page 95 mentions about CAPEX for 5 years boot with twenty equal quarterly assured payment with GST at the rate of 18% and cess at the rate of 1%. The total boot amount of CAPEX for 5 years is Rs 168,90,26,174 (one hundred and sixty-eight crore, ninety-lakh twenty-six thousand, one hundred and seventy-four rupees) i.e., the basic price of Rs 141,93,49,648 (one hundred and forty-one crore, ninety-three lakh, forty-nine thousand, six hundred and forty-eight rupees); along with GST and cess calculated at Rs 26,96,76,440 (twenty-six crore, ninety-six lakh, seventy-six thousand, four hundred and forty rupees). Page 97 of Ext R6(a) begins with the facility management services (FMS) which is the OPEX details concluding at page 103 which in total for five years including GST at the rate of 18% and cess at 1% is Rs 66,92,02,688 (sixty-six crore, ninety-two lakh, two thousand, six hundred and eighty-eight rupees) i.e., the basic price of Rs 56,23,55,200 (fifty-six crore, twenty-three lakh, fifty-five thousand, and two hundred rupees) along with GST and cess calculated at Rs 10,68,47,488 (ten crore, sixty-eight lakh, forty-seven thousand, four hundred, and eighty-eight rupees). The terms and conditions are incorporated at page 106 with total project cost inclusive of CAPEX and OPEX meaning capital project expenses and operational project expenses which is Rs. 235,82,28,812 (two hundred and thirty-five crore, eighty-two lakh, twenty-eight thousand, eight hundred and twelve rupees) and payment in twenty quarterly equal payments of Rs 11,79,11,440 (eleven crore, seventy-nine lakh, eleven thousand, four hundred,


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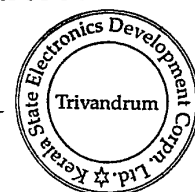


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and forty rupees). CAPEX includes implementation and commissioning of one State Central Control Room and twelve out of the fourteen District Enforcement Control Room (the Ernakulam district and the Kozhikode district enforcement control rooms established as Pioneer systems are already in functioning state). This has 726 different kinds of Automatic day and night Traffic Enforcement Systems and 5 years Onsite Comprehensive Warranty. OPEX consists of the salary and benefits of around 146 Technical Man Power required to run the project for a period of 5 years from the time the project becomes operational at the State Central Control Room and 12 District Control Rooms, the broadband connectivity charges for 726 enforcement systems, leased line charges, electricity charges for all 14 District Enforcement Control Rooms and State Central Control Room, postal charges for sending challans to violators etc and all connected facility management at the capital infrastructure buildups by way of CAPEX. The Safe Kerala Project includes both CAPEX and OPEX. The boot is totally different from the ordinary term expected of build, own, operate, and transfer. Here, it implies only that the Government's upfront expense involved in the entire project is nil. The Traffic Enforcement System's owner is the Government and operation is through Government functionaries. The fine is collected through the system and goes to the Ministry of Road Transport and Highways, Government of India (MoRTH) and is distributed to the state exchequer. KELTRON has no control over the same except for supply of the required technical assistance at the control rooms. It

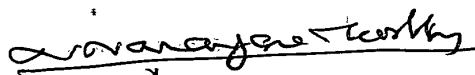


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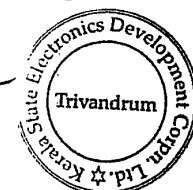


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is in this scenario that the original proposal vide Ext R6(a) was considered in detail by the six-member Technical Committee of the MVD chaired by the Joint Transport Commissioner which recommended the proposal as detailed above on 22.10.2019. The same was vetted by the Transport Department and forwarded to the Government who constituted a High Level Committee to verify and consider this respondent's project proposal vide orders dated 17.12.2019. A true copy of the Government Order constituting the High Level Committee dated 17.12.2019 is submitted herewith to be marked as **Exhibit R6(b)**. The High Level Committee submitted the report with recommendations on 28.12.2019 before the Government. A true copy of the minutes of the meeting of the High Level Committee dated 28.12.2019 is submitted herewith to be marked as **Exhibit R6(c)**. The said recommendation was forwarded to the Finance Department and ultimately the Government issued administrative sanction for implementing the Fully Automated Traffic Enforcement System on Boot model for 5 years and Facility Management Services for 5 years with directions including execution of the service level agreement (SLA) by the MVD with KELTRON for implementation of the project as per the conditions put forth by the Technical Committee in its meeting held on 28.12.2019 which should be incorporated in the SLA. A true copy of Government Order GO RT No: 134/2020/TRANS granting administrative sanction for the project on 27.04.2020 is submitted herewith to be marked as **Exhibit R6(d)**. Based on this, a work order was issued by the MVD represented by the 5th Respondent to

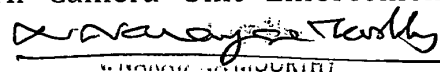


N. NARAYANA MOORTHY
Chairman & Managing Director

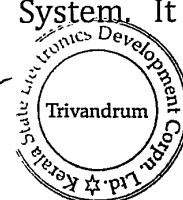


6

KELTRON on 14.05.2020 which clearly states the payment terms as per Ext R6(a) project proposal submitted by KELTRON. A true copy of the Work Order issued to KELTRON by the Transport Commissioner dated 14.05.2020 is submitted herewith to be marked as **Exhibit R6(e)**. It refers to Exts R6(a) and R6(b) and other relevant records and also payment terms as specified in point 2 of Ext R6(e). The SLA was executed on 28.05.2020. A true copy of the SLA executed between Respondents 5 and 6 dated 28.05.2020 is submitted herewith to be marked as **Exhibit R6(f)**. Clause 4(c) of Ext R6(f) deals with the payment terms which is 20 equal quarterly assured payments of Rs 11,79,11,440 (including applicable tax) and the 1st quarterly payment beginning from Go Live of the project and clause 4(d) makes it clear that quarterly payments include FMS (OPEX) charges also. No deviation was made from Ext R6(a) terms dated 22.08.2019. It is consequently that tenders were called for in strict compliance with the Store Purchase Manual (SPM) and Central Vigilance Commission (CVC) guidelines. The tender proceedings were completely transparent and there is no illegal enrichment as made out in paragraph 3 of the Writ Petition. The allegations made in the Writ Petition in this regard is denied as incorrect, especially in paragraphs 2 and 3. The privacy of citizens is not affected as contended in paragraph 4. The apprehensions made out in paragraph 5 is without any rhyme or reason. The averments raised in paragraphs 6 to 8 are unknown to this respondent. It is submitted that no outdated products were used in the installation of AI Camera Unit Enforcement System. It is



Chairman & Managing Director



respectfully submitted that the contentions set forth in paragraphs 9 to 15 are not known to this respondent. The contention in paragraph 16 is correct except to the fact that the Technical Committee ignored the CAPEX model and gave approval for BOOT model in spite of it being BOOT only nominally. It is submitted that the committee has approved the proposal, submitted by the MVD without any change in proposed payment terms. It is already detailed that the technical implication of BOOT cannot be applied to this project as the word denotes only one aspect which is that the state government does not invest any money upfront in this project which is solely done by KELTRON and its investor. The entire operation of the Traffic Enforcement System is done by the MVD and MoRTH due to which the return of investment made by this respondent and its investor is met by the twenty equal quarterly payments envisaged in Ext R6(a) project proposal. Fines are collected online as violators have to remit fines via the online portal of MoRTH envisaged for this purpose (Vahan portal) and the same goes directly to the state exchequer from which (income alone) the quarterly payments are made after verification of the project implementation and smooth functioning. Moreover, the investment return is only a year and a half after the investment and within five years from thereon. This is inclusive of the project implementation time, project commissioning, and trial run of one month and thereafter three months' time to get the first instalment (quarterly payment) which will be a year and a half from the outlay for KELTRON to start earning. Thus, it will take 6½ years for KELTRON



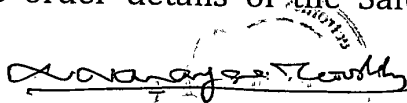
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N. NARAYANA MOORTHY
 Chairman & Managing Director

MANAGING DIRECTOR
 STATE ELECTRONICS DEVELOPMENT CORPORATION

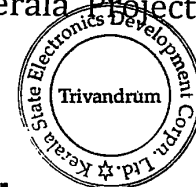
to get its full amount from the time of investment. Contentions to the contrary as indicated by the said statement are not correct. So also, the contention in the first sentence of paragraph 17 is not correct. There is no error with regard to the estimated projected cash flow statement in this Respondent's report.

4. It is respectfully submitted that the contentions set forth in paragraph 18 are not correct as the details are as per Ext R6(a). The projected cash flow which is mentioned in Ext R6(a) at page 104 is an estimated value only. Hence the contention to the contrary put forth in paragraph 18 is not correct. So also, the contentions set forth in paragraph 19 are not correct. KELTRON as a State PSU fully owned by the Government of Kerala has to strictly follow the SPM and CVC guidelines for purchase related activities. In the case of Safe Kerala Project all the Enforcement systems are manufactured by Keltron Communication Complex at Monvila, Thiruvananthapuram. For that, products were procured out of the 110 purchases made by transparent bidding processes and installation and commissioning was completed. For the Safe Kerala Project, KELTRON has done 110 purchase activities with various vendors through different procurement procedures; out of which 10 components estimated above 5 lakhs were procured through E-Tender (as approved by SPM & CVC guidelines), purchases estimated below 5 lakhs and above 2 lakhs through sealed quotations (as per SPM & CVC guidelines) and purchases estimated below 2 lakhs through e-mail (as per SPM & CVC guidelines). A true copy of the purchase order details of the Safe Kerala Project is



N. NARAYANA MOORTHY
Chairman & Managing Director

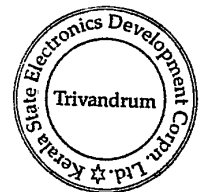
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Chairman & Managing Director



submitted herewith to be marked as **Exhibit R6(g)**. The contentions put forth in paragraphs 19, 20, and 21 are all based on notes from Finance Technical wing, Government of Kerala. All the purchases related to the Safe Kerala Project are as per the SPM and CVC guidelines. The project was completed on 30.06.2022, and trial run was conducted in April 2023. The Go-Live was effected on 5th June 2023. In view of the same, the contentions put forth in paragraph 22 also lose their importance. Ext P2 was superseded by Ext P3 (Ext R6(d)). The contention raised in paragraph 23 with regard to the flaws in the project proposal is not correct. The Chief Technical Officer has considered the same before the Government Order was passed. In view of the same, the contentions put forth in paragraphs 24 and 25 are also not correct. The entire process was completed transparently considering each and every aspect with minute detail. The contention of the subtlety in arriving at the figures is devoid of merits for the reason that Ext R6(a) contains all details. Ext R6(d) administrative sanction and Ext R6(e) work order were issued after detailed work study with respect to the technical specifications and features of the proposed system, and cost benefit analysis, by the MVD and other Government Departments like Transport, IT and Finance. There were no deviations with regard to either any technical or commercial aspect from the original project proposal with DPR submitted by KELTRON on 22.08.2019 vide Ext R6(a). As such, contentions to the contrary alleged in paragraph 27 are not correct.

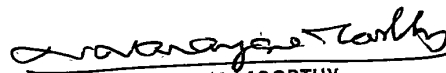
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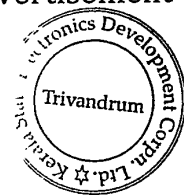
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 NARAYANA MOORTHY
 നാരായണ മൂർത്തി
 Chairman & Managing Director



5. It is respectfully submitted that the contentions set forth in paragraphs 28 and 29 are correct but for the last sentence of paragraph 29. The contractor would not be in possession of all the data, security, configuration and facility arrangement because once the commissioning of the systems is done, they have no further role thereafter. The facility arrangement is done by this respondent as per Facility Management Service. The data, security, configuration are all in consonance with the privacy policy enumerated in the guidelines of the Honourable Apex Court's decision in *Puttaswamy*. Paragraph 30 deals with the minimum eligibility criteria as per the tender. The contentions set forth in paragraph 31 that the title of the tender was stated to be in BOOT so as to restrict the number of participants and to ensure that only those with the blessings of higher ups would come out as the successful bidder is totally incorrect. In e-Tender No KSEDC/KCC/CPG/ENQ/0041/20-21 dated 26.06.2020, the payment terms are clearly mention on page no.12 Cl.No.1.6.3 Sub.Cl. No.11, wherein it is mentioned that 'the payment will be quarterly in 20 equal instalments starting from 1st quarter after Go-Live'.

A true copy of the e-Tender document is submitted herewith to be marked as **Exhibit R6(h)**. The production of 726 different kinds of traffic enforcement systems for this project was carried out by KELTRON using the above components in its Monvila unit. KELTRON published tender on 26.06.2020 in the e-Tender portal owned by the Government of Kerala and the tender advertisement


-N. NARAYANA MOORTHY
Chairman & Managing Director



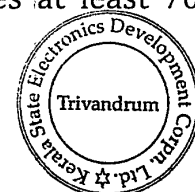
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was published in the national edition of *The Hindu Business Line* and the *Mathrubhumi daily*.

For any complaints, doubts, or suggestions regarding the above E-Tender, time has been given until 30.06.2020. On 01.07.2020 a pre bid meeting was conducted. Participation was allowed directly or online, and doubts regarding the E-Tender could be discussed. Representatives from eight different organizations participated in the pre bid meeting. Keltron extended the tender twice as per the request from the organizations interested in participating in the tender. The tender has two parts, namely technical bid and commercial bid. The technical part pertains to various electronic modules for manufacturing enforcement systems, modules for manufacturing artificial intelligence cameras, vehicles for mobile enforcement systems, installation of Keltron enforcement systems and street furniture, state enforcement control rooms and 12 district control rooms, supply of related software and software licenses for operating the systems, as well as establishment and maintenance for five years, were included in the above E-Tender. Subcontracting is permitted in the above E-Tender. (Clause 1.4, subclause 26)

The Tender Scrutiny Committee examined the technical part of all the parties participating in the tender and opened the financial part only to the qualified parties and awarded the work order to the firm that had quoted the lowest bid (L1). The tender specifies 12 eligibility criteria. The minimum eligibility score sheet is also an eligibility consideration. Only the parties who scores at least 70


N. NARAYANA MOORTHY
Chairman & Managing Director



12

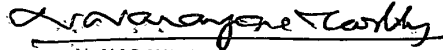
marks out of 100 will clear technical qualification. Considering the aforementioned criteria, the tenders were opened and the following four companies participated:

- M/s Ashoka Buildcon Ltd
- M/s Akshara Enterprises India Private Limited
- M/s Gujarat Infotech Limited
- M/s SRIT India Private Limited

The Tender Scrutiny Committee examined the technical bids of the above four companies in detail and rejected M/s Gujarat Infotech Limited for not having the minimum qualification stipulated in the tender and opened the financial bids to the other qualified firms and the amount submitted by each of them is as given below:

- M/s SRIT India Private Limited – Rs. 129,66,45,692/- + 18% Tax
- M/s Ashoka Buildcon Ltd – Rs.136,53,68,048/- + 18% Tax
- M/s Akshara Enterprises India Private Ltd – Rs.147,16,93,141/- + 18% Tax

M/s SRIT India Private Limited, the lowest quoted company, was contacted by Keltron for price negotiation, and finally they agreed to execute the project for an amount of 128,15,85,545/- + 18% tax. Accordingly, Keltron issued a Letter of Intent (LoI) to M/s SRIT India Private Limited vide KCM/PUR/LOI/001/2021 dated 11.09.2020. A true copy of the LoI dated 11.09.2020 issued by KELTRON to M/s SRIT India Private Limited (the 7th Respondent) is submitted herewith to be marked as **Exhibit R6(i)**. The 7th Respondent made a security deposit of Rs 6,00,00,000 (six crore rupees) to KELTRON as stipulated in the e-Tender and a service

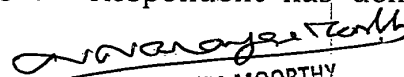


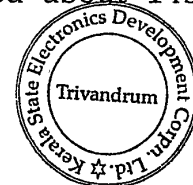
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Chairman & Managing Director



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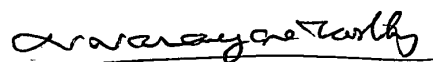
level agreement was signed between M/s SRIT India Private Limited and KELTRON on 01.10.2020. The 7th Respondent had to supply the required electronic modules and other products/equipment for assembling the cameras and enforcement systems manufactured at KELTRON's Monvila unit and to install them on the roads once so manufactured by KELTRON, had to construct enforcement control rooms and effect supply, installation and commissioning of related aggregates started under the supervision of KELTRON and MVD. After completing the manufacturing process using different electronic modules supplied by the 7th Respondent to Keltron, it was handed over to the 7th respondent for field installation work and returned to Keltron for commissioning of the project. In June 2022, the installation of Safe Kerala Project was completed and the same was notified to the MVD vide letter no KCC/CPG/G36/2022-23/687 dated 30.06.2022. A true copy of the letter dated 30.06.2022 is submitted herewith to be marked as **Exhibit R6(j)**. In view of the same, the present contention set forth in paragraphs 32, 33, 34, 35, and 36 are not correct. To the knowledge of this Respondent and the tender documents of the 7th Respondent, the 7th Respondent was established in 1999. It is a software and IT systems integration company which complied with all the eligibility conditions stipulated in clauses 7 to 9 of the Tender and as verified by Tender Evaluation Committee. Hence the contentions to the contrary set forth in paragraphs 36 and 37 are not correct. According to the tender document, the 7th Respondent has delivered about 145

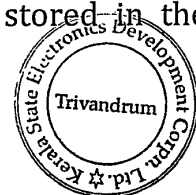

N. NARAYANA MOORTHY
Chairman & Managing Director



14

projects across 17 countries in the last 20 years of which 34 projects were delivered for establishments of the Central and State Governments in India. The 7th Respondent participated in the tender as a single bidder and not as a consortium, but they were at liberty to subcontract or form consortiums of their own to carry out the work which they have done effectively. The contentions to the contrary set forth in paragraphs 38 and 39 are also not correct. The contentions set forth in paragraphs 40, 41, and 42 are not within the realm of this Respondent. The contentions set forth in paragraph 43 are not correct because Ext P16 agreement is a joint project execution agreement by the 7th Respondent and its partners to which KELTRON is not a party. The averments are misconceived. The contentions set forth in paragraph 44 are also not correct because the 7th Respondent cannot violate the right to privacy of the citizens because all the data related to the traffic rule violations are securely stored in the servers at the State Central Control room which is under the direct control of the MVD authorities and technically supported by KELTRON. Neither the 7th Respondent nor any other agency has access to the data. The configuration of the equipment and the facility management service is taken care of by KELTRON alone. Hence the contentions set forth in paragraphs 45, 46, 47, and 48 are not known to this respondent. It is a nonconcern to this Respondent. Images capturing traffic rule violations are securely stored in the servers in the State Central Control Room controlled by the MVD. The information pertaining to the challans relating to the traffic rule violations are securely stored in the

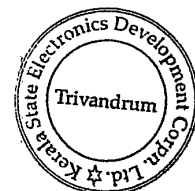

N. NARAYANA MOORTHY
Chairman & Managing Director



servers of MoRTH. The images and the information contained in the challans are, therefore, not handled by private parties. All the enforcement systems transmit data securely using 128-bit encryption technology to the State Central Control Room. These connections are established using Internet of Things (IoT) subscriber identification module (SIM) cards which are programmed to communicate only with the static internet protocols (IPs) of the data centre.

6. It is respectfully submitted that the contentions set forth in paragraph 49 are not entirely correct. It is true that this respondent has stated that the project cost could be limited to 75 crore rupees if the money was invested by the Government and tendered at the very inception (entire amount as advance payment) for carrying out the project. A detailed worksheet on five-year BOOT model submitted by KELTRON to the MVD shows how the price gets significantly increased with zero upfront investment for project implementation by the Government. A true copy of the detailed worksheet on 5 year BOOT model (5 years + 1½ years) is submitted herewith to be marked as **Exhibit R6(k)**. The truth that the cost of the project, cost of equipment, software, civil work and service would only come to Rs. 75 Crore, as revealed by the MD of KELTRON, is in line with KELTRON's original costing of the project. The said amount will suffice for the above scope of work if the Government paid the entire amount as interest free advance (upfront payment). However, in the present project vide Ext R6(a), the model and repayment method are already stipulated (5 year


N. NARAYANA MOORTHY
Chairman & Managing Director



BOOT with 20 quarterly instalments). It is evident that financial cost with interest (for 6 ½ years) including execution contingency, risk factor and profit along with GST payment and also the interest cost on security deposit (6 Crore) to Keltron for a period of 6 ½ years. The overall costing of the project with upfront investment for a return period of 6.5 years is standard and within the well-known financial computation in every financial institution against the upfront investment. These facts have been deliberately ignored to make baseless allegations for the purpose of this Writ Petition. The tender process was transparent and the selection of the 7th Respondent was based on technical evaluation of its compliance and it being the lowest bidder. KELTRON will be getting the investment return only by a period of 6½ years as detailed above. Apart from the actual investment for the project, KELTRON has to meet the industrial bank loan interest at the rate of 12% for the 6½ years and 9% profit of the paying company and 5% of KELTRON's own profit. It is added with the actual cost of each item given in the Safe Kerala Project Proposal. Ext R6(k) detailed worksheet was submitted with the project.

7. It is respectfully submitted that the contentions raised in paragraphs 50 and 51 of the Writ Petition are devoid of merits for the reasons stated in the foregoing paragraphs of this counter affidavit. Since the entire work in the scope of the 7th Respondent was completed in June 2022 and handed over to the MVD, subsequent contentions alleged against the project assignment are devoid of merits. The averments in paragraphs 52 and 53 are a

V. Narayana Moorthy

V. NARAYANA MOORTHY
 Chairman & Managing Director


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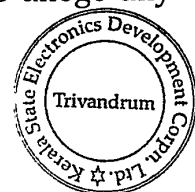


17

matter of concern of the Government, but the contentions therein that corruption and illegalities in the Safe Kerala Scam are regularized are not correct. More over there have been no changes in the terms and conditions at any stages of the project execution.

8. It is respectfully submitted that Ext P27 GO was issued giving comprehensive administrative approval to the Safe Kerala Project. There is no tiding over of any illegalities in the project as contended by the petitioners in paragraph 54 of the Writ Petition. Since the very inception, this Respondent has submitted the project proposal with 20 equal quarterly payments after commissioning and Go-Live which are already detailed in the foregoing paragraphs which was approved and project implemented completely. The Government realized that the entire fine collected by the MVD by virtue of the investment made for the project will be obtained by the Government Exchequer and hence the project cannot be considered as a conventional BOOT model by which the investor cannot get the investment back by functioning for the particular BOOT period and the amount of investment being the project cost is to be reimbursed to KELTRON in twenty equal quarterly instalments from the date of the project GO-Live in consonance with the investment reimbursement by quarterly payment model. But Work Order being already issued and work completed, the Government could not alter the model for project financing and hence issued a comprehensive administrative sanction for the Safe Kerala Project with nine conditions for ensuring flawless functioning of the project as envisaged. There is no substantial change to allege any


N. NARAYANA MOORTHY
Chairman & Managing Director

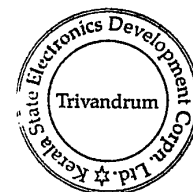


18

illegality in Ext P27 as contended in paragraphs 54 and 55. The 7th Respondent's internal arrangement is their concern and does not affect this respondent. Ext P28 is answered by the Department appropriately by Ext P29. The contentions set forth in paragraphs 57, 58, and 59 are not correct. The Public Information Officer has given the information he had vide Ext P31 whereas this respondent has given the correct data vide Ext P33. The allegation that the information is not correct is baseless because the products used by this respondent for the Safe Kerala Project are of the value mentioned in Ext P33. The cost has not been slashed; neither is the technology outdated. Baseless allegations are made against the Government and KELTRON. This respondent has not facilitated the loot of public money by purchasing outdated equipment at outrageous prices through shell companies controlled by people with access to power. The said allegation is totally misconceived, baseless, and incorrect. In fact, the artificial intelligence camera is commissioned by KELTRON for the first time in India using the most advanced technology and finest equipment and it has been in the field installing Automated Traffic enforcement system right from 13.03.2008. Keltron has recently effected 39 automated traffic enforcement systems for order value of Rs 9,00,00,000 (nine crore rupees) in the Pune-Mumbai Expressway in 2022. The previous experience of KELTRON on Automated Traffic Enforcement Systems in India are as follows:



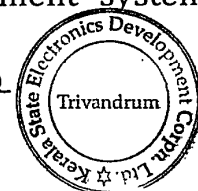
N. NARAYANA MOORTHY
Chairman & Managing Director



- i. Work order from the Pune Municipal Corporation for ITMS Number 11502 dated 03.03.2008 for a value of Rs 17,00,00,000 (seventeen crore rupees)
- ii. Work order from Kolkata Commissioner of Police for ITMS Number 4835A dated 19.03.2008 for a value of Rs 28,00,00,000 (twenty-eight crore rupees).
- iii. Work Order H6(C)/34668/11 from Kerala Police dated 29.10.2011 for six speed violation detection systems for a value of Rs 1,28,00,000 (one crore and twenty-eight lakh rupees).
- iv. Work Order H6(C)/36163/12 from Kerala Police dated 21.06.2012 for nine speed violation detection systems for a value of 1.281 crore rupees.
- v. Work order from MVD number A1/KRA/242/2011 dated 13-07-2011 (Road Safety Authority) for 15 numbers of automated enforcement system for a value of Rs. 2.24 crore.
- vi. Work order MVD A1/KRA/242/2011 dated 06-12-2011 (Road Safety Authority) for 25 numbers of automated enforcement system. Order value of Rs. 8.5 crore.
- vii. Work order from Kerala Police number H6 (C)/94880/2012 dated 26-10-2012 for 100 numbers of SVDS - Speed Violation Detection System with State Control Room on BOOT Model including facility management service. Total order value is Rs. 40.31 crore.
- viii. Work order from Kerala Transport Commissioner number MIT - 5/TC/18365/2013 dated 07-08-2013 for 94 systems of different kind of automated traffic enforcement systems at

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NARAYANA MOORTHY
Chairman & Managing Director



20

Mannuthy, Mangeswaram stretch, for order value of Rs. 17 crore.

ix. Work order from Transport Commissioner number MIT-5/7671/TC/2014 dated 17-01-2014 for 14 numbers of automated Speed Violation Detection System. Order value of Rs. 7.99 crore.

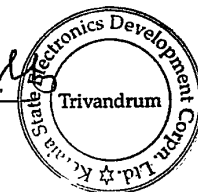
x. Work order from Transport Commissioner Number MIT-5/9924/TC/2015 dated 17-03-2017 for automated speed enforcement system – SVDS 39 numbers. Order value of Rs. 7.14 crore.

xi. Pune – Mumbai Express way for 39 systems of traffic enforcement system dated 28.08.2022 for order value of Rs 9 crore.

In addition to this we are maintaining the traffic signals of Ahemadabad city for the past 4 years. Order value 21.30Cr.

9. It is respectfully submitted that the contentions set forth in paragraphs 60 to 64 are also not correct. The project was commissioned in June 2022 and has started functioning after one month trial run in May 2023. Fine imposition has begun on 05.06.2023, whereas the Writ Petition has been prepared subsequently and moved on 20.06.2023 challenging matters that have already been finalized and project completed and handed over to the MVD a year back. The 7th Respondent's internal arrangement is their concern and does not affect this respondent. The subcontracts entered through consortium agreements by the 7th respondent are not the present concern of this respondent as the 7th respondent has done the work as per the work order issued to it and in consonance with the service level agreement executed between respondents 6 & 7. There is no siphoning of public funds

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Chairman & Managing Director



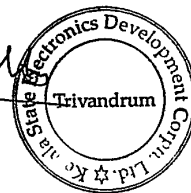
as alleged. KELTRON has carried out the work without any loss to the public exchequer and the allegations to the contrary made in this paragraph are against the truth because the entire aspect has been submitted in detail through Exts R6(a) and R6(h) for the consideration of the MVD and the Government as early as in 2019. The same has been considered and debated in detail before the issuance of Ext R6(e) work order and entering into the SLA after which a transparent tender process was made resulting in the 7th Respondent being awarded with the purchase order. The work is now completed and handed over and has commenced functioning as detailed in the foregoing paragraphs. Hence the entire allegations against this respondent are devoid of merits and bonafides.

10.It is respectfully submitted that the contentions set forth in ground A is not correct because the 7th Respondent met all the technical qualification criteria and possesses the quality certifications, which are CMMI level 5, ISO 27001 for information security, and ISO 20000 for network all infra management for e-Governance and e-Health. It is informed that the 7th Respondent has executed more than 170 technology projects in 19 Indian states and 18 overseas countries, including Central Government project and it has more than 1000 employees. So also, the contentions enumerated in ground B for the reason that as far as the Safe Kerala Project is concerned, the authority for data access is MVD only. KELTRON will give technical support to MVD. There is no role for the 7th Respondent or any private company in data access. The 7th

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**N. NARAYANA MOORTHY
Chairman & Managing Director**

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Chairman & Managing Director**



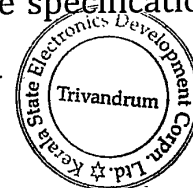
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Respondent has no role in deciding the instalment payment. The payment model is defined in Ext R6(a) project proposal and vetted in Ext R6(f) SLA between KELTRON and MVD. The quarterly instalment from Government after Go-live includes manufacturing expenses, FMS charges, and PMC charges to KELTRON and payment to bidder, and it is directly paid to KELTRON.

11. It is respectfully submitted that the contentions set forth in ground C are not correct. The project does not entail the mere installation of cameras, but the setting up of an automated traffic enforcement system which has many components including most importantly, an AI-based enforcement system with automated number plate recognition (ANPR) cameras that employ global shutter technology, fixed and mobile radar-based speed enforcement systems (Speed Violation Detection System (SVDS) and Mobile Speed Violation Detection System (MSVDS) respectively), red light violation detection system, AI-based parking violation system, 12 District Enforcement Control Rooms, and 1 State Central Control Room with all backend software. As elucidated above in paragraph 6, the higher cost of implementing the automated traffic enforcement system is owing to the BOOT (albeit nominally) model in place without any investment by the Government and return of investment to KELTRON in 6½ years including the 1½ year for project implementation resulting in the first quarterly payment. KELTRON has executed many traffic enforcement projects including in other Indian states and the contention that KELTRON lacks the capacity and expertise to estimate the specifications and

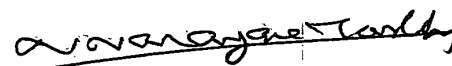
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 N. NAKAYANA MOORTHY
 Chairman & Managing Director

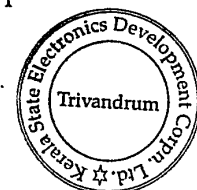


cost for the current project is incorrect. KELTRON has utilized state-of-the-art technology in the current project and ensured the operation of the systems for a period of 10 years. The reply to grounds D and E is already included in this paragraph and the preceding ones. So also, the reply to ground F. The eligibility of the 7th Respondent and its consequent selection as the L1 bidder has already been detailed in the preceding paragraphs. The contentions in paragraph G are not correct because the 7th Respondent participated as a single bidder in the e-Tender and submitted the list of equipment and the software provided by the original equipment manufacturer (OEM) with manufacturer authorization forms (MAF) from different OEMs as required by clause 1.6.1 of Ext R6(h) tender document (page 9). In Ext P14 SLA executed between KELTRON and the 7th Respondent, the 7th Respondent has declared that M/s Alhind group is a subcontractor along with M/s Presadio Technology Pvt Ltd and that they are not its consortium partners. The contentions set forth in paragraphs H and I are with regard to the discretionary powers of the Government Departments and do not pertain to KELTRON.

12. It is respectfully submitted that the contentions set forth in ground J are incorrect and unfounded because the 7th Respondent was found to be having the requisite expertise to the extent possible in a de novo project. The tender evaluation committee selected the 7th Respondent after considering the various aspects involved. Subcontracting is permitted as per the tender document. The contentions raised in ground K are not within the scope of this



N. NARAYANA MOORTHY
Chairman & Managing Director



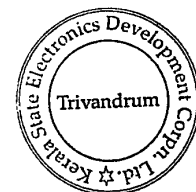
24

respondent. The reply to the averments in ground L have already been elaborated in paragraph 5 above. Neither the 7th Respondent nor any other agency has any role in data security, etc. The contentions set forth in ground M are not correct to the knowledge of this respondent.

13. It is respectfully submitted that in relation to ground N, the actual position is, before issuing the Government Order including the administrative sanction, Ext R6(a) proposal including the technical and commercial portion are verified and recommended by the Transport Commissionerate, MVD, IT Department, and the Finance Department. Hence, contentions to the contrary averred are not correct. So also, the contentions set forth in ground O because the allegation that confidential and private data of individuals including their Driving Licenses and other information from the Vahan portal are left to the mercy of private operators shows the total ignorance of the petitioners about the data management scheme. The Vahan portal data is under the control of MoRTH. All the enforcement data related to the Safe Kerala Project are stored in the State Central Control Room which is under the control of the MVD. Hence, the right to privacy is not violated. So are the allegations set forth in ground P for the reason that the authority for imposing fines for violating traffic rules is only with the MVD. There is no delegation of the authority.

14. It is respectfully submitted that the allegations in grounds Q and R are already answered to in the foregoing paragraphs. The details of how a Rs 75,00,00,000 (seventy-five crore rupees) upfront

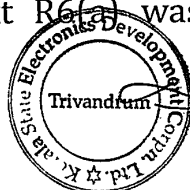

N. NARAYANA MOORTHY
Chairman & Managing Director



25

investment project which is meant by CAPEX has turned out to be a Rs 236,00,00,000 (two hundred and thirty-six crore rupee) project with Facility Management Services (OPEX) for 5 years as well is detailed in paragraph 3 above of this counter affidavit. The overall costing of the project with financial cost and interest for 6½ years, including execution contingency, risk factor, and profit along with GST investment and also the interest cost on security deposit to KELTRON at the rate of Rs 6,00,00,000 (six crore rupees) for a period of 6½ years, if calculated and computed will reveal how the project cost is arrived at. The details are well-enumerated in ExtsR6(a) project proposal and R6(k) worksheet. This clear fact is ignored to make baseless allegation in the matter of cost of the project. To reiterate, the tender process was transparent and the selection of the 7th Respondent was based on technical evaluation and it being the lowest bidder. The contentions to the contrary are all baseless. The Government of Kerala has made no payment to KELTRON for the execution of the project till date. The CAPEX portion of the project barring the AMC charges has been fully committed and the Facility Management Services (FMC) is presently owned by KELTRON, which involves considerable daily expenditure. The 7th Respondent has remitted around Rs 23,00,00,000 (twenty-three crore rupees) in GST. As stated earlier, the data collected is the sole responsibility of the MVD and not with the 7th and 9th respondent as alleged.

15. It is respectfully submitted that the Safe Kerala Project as envisaged in Ext R6(a) was fully commissioned and has been



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 N. NARAYANA MOORTHY
 Chairman & Managing Director

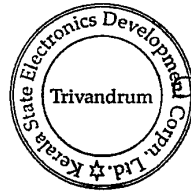
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satisfactorily operated from 05.06.2023. The above Writ Petition with baseless allegations against this Respondent has seriously tarnished its reputation nationally. This Respondent's future business has been seriously impacted because of the false allegations maligning its fifty-year old prestigious status as a state PSU in the field of electronic information technology. This Respondent survives on its own fund and adverse publicity has a serious impact on its sustainability.

16. It is respectfully submitted that in view of the above reality, no reliefs can be granted in the above Writ Petition which is totally devoid of merits and bonafides. It is humbly prayed that this Honourable Court may be pleased to dismiss the above Writ Petition with exemplary costs to this respondent for the damage caused to it in the interest of justice.

The above stated facts are all true.

Dated this the 7th day of August 2023.



N. Narayana Moorthy
Deponent
N. NARAYANA MOORTHY
 Chairman & Managing Director

Solemnly affirmed and signed before me by the deponent who is personally known to me on this the 7th day of August 2023 in my office at Ernakulam.

M. A. Zohra
Adv M A Zohra

M. A. Zohra
Standing Counsel for KELTRON

N. NARAYANA MOORTHY
 Chairman & Managing Director

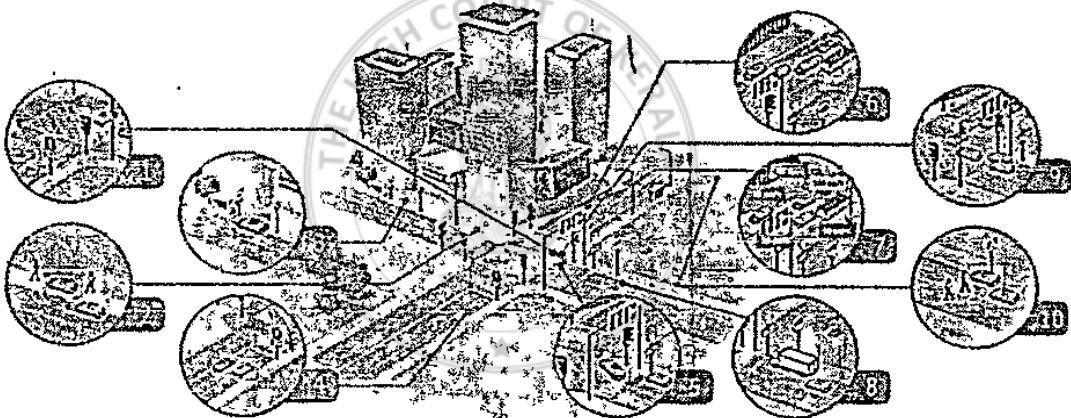
KELTRON

Kerala State Electronic Development Corporation Ltd.

An ISO 9001-2015 / IEC 27001-2005/ CMMI3 Certified Govt. Company

Established: 1973

PROJECT PROPOSAL FOR
ADVANCED AUTOMATED TRAFFIC ENFORCEMENT
SYSTEM BASED ON BOOT MODEL FOR 5 YEARS
AND FACILITY MANAGEMENT SERVICES FOR 5
YEARS UNDER
SAFE KERALA PROJECT



Submitted to

Motor Vehicle Department

Submitted By

KELTRON COMMUNICATION GROUP

Keltron Communication Complex

Monvila, Kulathur (PO), Trivandrum-695583

Kerala, India

Telephone: 0471 2598948 | FAX: 0471 2598984 | Mobile: 09447210533

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**KERALA STATE ELECTRONICS
DEVELOPMENT CORPORATION LTD.**
(A Government of Kerala Undertaking)

KELTRON®
ISO 9001:2015 CERTIFIED

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E-mail : keltronseu@gmail.com

KCC/SEU/G36/IT/2019-20

22.08. 2019

To,

**The Transport Commissioner,
Trans Towers, Vazhuthacad,
Thiruvananthapuram, Kerala.**

Respected Sir,

Sub: 'SAFE KERALA' Project proposal - Reg
Ref: (1) Technical presentation meeting we had with Hon'ble Minister for Transport
(2) Copy of the minutes of meeting


Based on the presentation meeting we had with Hon' ble Minister for transport on 07.08.2019 at south conference hall- Secretariat, TVPM. The Hon' ble Minister directed to submit a revised Techno-Commercial proposal by

- Excluding Ernakulam & Calicut Control room.
- The State Central Control Room and District Control room for Thiruvananthapuram may be combined together in the same premises.
- Exclude the hand held devices proposed for field officers.
- Submit the proposal with 5 year BOOT

Considering all the recommendations by Hon'ble Minister, Principal Secretary and Road Safety Commissioner we are re submitting the detailed techno-commercial project proposal on BOOT basis for 5 Years including Facility Management Services (FMS) for your consideration. After the BOOT period Government can decide whether the AMC & FMS service can continue with Keltron or not.

Thanking you,
Yours faithfully,

**FOR KERALA STATE ELECTRONICS
DEVELOPMENT CORPORATION LTD.**


Gopakumar S P
Head - Keltron Communications Division,
Monvila, Kulathur PO, Thiruvananthapuram - 695583
Phone 04712598948 Mob. No. 09447210533
Email: spgopan@yahoo.com, keltronseu@gmail.com

Copy to

1. P S to Minister for Transport
2. Road Safety Commissioner
3. Principal Secretary - Transport





ISO 9001 : 2015

123685/2020/INWARD TC

File No. TRANS-A2/258/2019-TRANS

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ill now:

Principal Secretary (Transport) directed to ensure that cameras under the project are not installed in the same location by different agencies. For this, data sharing between Police Department and the Motor Vehicle Department is necessary. Motor Vehicle Department should identify the locations in which cameras are to be installed and share this data with Police Department so as to avoid wastage / overlapping of infrastructure. Principal Secretary also pointed out that a good number of cameras installed by different agencies as part of traffic management / enforcement are not working as observed in the review meeting held by the Hon'ble Chief Minister. Hence it should be monitored whether the cameras installed under this project are working. He also directed that the AMC for maintaining the cameras should be given for a period of 10 years.

The Principal Secretary asked whether the facilities of State Data Centre under Kerala State IT Mission can be made available to Motor Vehicle Department for collection of data from the new cameras. Representative of KSITM informed that there are practical difficulties in accommodating data afresh under SDC. The Joint Transport Commissioner informed that the data centre under Vahan Sarathy can be used free of cost when linked to Vahan Sarathy.

After detailed discussions, the Technical Committee approved the boot model of the proposal submitted by Motor Vehicle Department for implementing fully automated traffic enforcement system for 'Safe Kerala' project subject to certain conditions as mentioned below.

The meeting ended at 12:25 pm.

Decision of the Technical Committee

Approved the proposal submitted by Motor Vehicle Department for implementing Advanced automated traffic enforcement system on boot model for 5 years and Facility Management Services for 5 years under 'Safe Kerala' Project, subject to the following Conditions

1. The Motor Vehicle Department should identify the exact location in which cameras are to be installed and share this data with Police Department to avoid duplication / wastage of infrastructure. It

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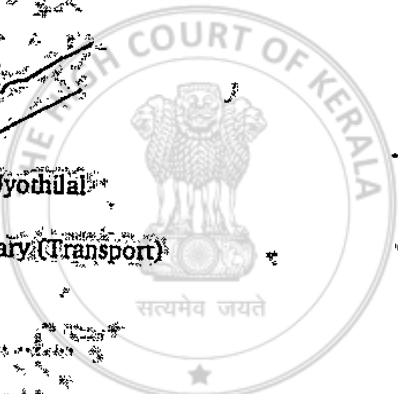
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336/355

should be ensured that cameras are not installed in the same location by different agencies.

ii) The data collected through the cameras may be shared with Police Department on a need based strategy.

iii) It should be frequently monitored to ensure whether the cameras installed under the project are working. AMC for maintaining the cameras should be given for an extended period of 10 years.



Shri. K.R. Jyothilal

Principal Secretary (Transport)

Smt. R. Sreelekha

Transport Commissioner

Shri. Santhosh Kumar

Sr. Consultant, KSITM

Shri. Shibu.K.ity

Nodal Officer (Safe Kerala)

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TABLE OF CONTENTS

PART A TECHNIAL PROPOSAL 4

1. INTRODUCTION 5

2. Accident Statistics of Kerala for Last 10 Yrs. 6

3. PROJECT OVERVIEW 7

3.1. Project Components 8

3.2. GENERAL VIOLATIONS 11

3.3. VIOLATION EXAMPLES 12

4. AI - ANPR CAMERA SYSTEMS 15

4.1. VISUAL PROCESSING UNIT (VPU) 15

4.2. ANPR CAMERA TECHNOLOGY 18

4.2.1. AI - ANPR CAMERA SYSTEM SPECIFICATIONS 21

5. RED LIGHT VIOLATION DETECTION SYSTEM 24

5.1. RLVD TECHNICAL SPECIFICATION 26

6. SPEED VIOLATION DETECTION SYSTEM 30

6.1. SVDS- TECHNICAL SPECIFICATION 31

7. MOBILE SPEED ENFORCEMENT SYSTEM 33

7.1. MOBILE SPEED ENFORCEMENT SYSTEM SPECIFICATION 34

8. PARKING VIOLATION DETECTION SYSTEM 36

8.1. TECHNICAL SPECIFICATION OF PVDS 36

9. GENERAL ENFORCEMENT MANAGEMENT SYSTEM 38

10. CONTROL ROOM MANAGEMENT SOFTWARE 39

10.1. CHALLAN PROCESSING SOFTWARE 41

10.2. PAYMENT MANAGEMENT APPLICATION 43

11. STATE CENTRAL CONTROL ROOM INFRASTRUCTURE 50

11.1. PROPOSED BOM- SCCR 50

11.2. SCR LAYOUT 53

11.3. TECHNICAL DETAILS OF MAIN HARDWARE COMPONENTS 54

11.4. CIVIL WORKS 74

12. DISTRICT ENFORCEMENT CONTROL ROOM (DECR) 76

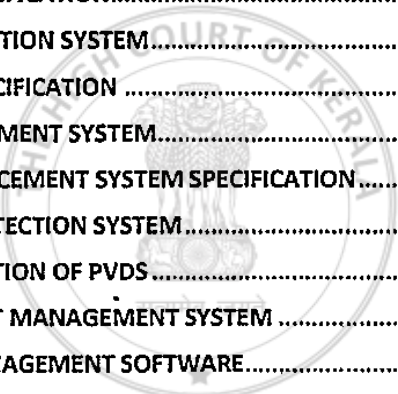
12.1. DECR- SUB SYSTEM SPECIFICATIONS 77

12.2. DECR- LAYOUT 81

13. TOTAL ENGORCEMENT SYSTEM BOQ 93

13.1. PHASE 1 93

13.2. PHASE 2 93



GOPAKUMAR SP
Head CPG
Communication Projects Group, KCC
Monvila, Thiruvananthapuram-695 583



2
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PART B: COMMERCIAL PROPOSAL.....94

1. CAPEX FOR 5 YEAR BOOT WITH QUATERLY ASSURED PAYMENT 95

2. FACILITY MANAGEMENT SERVICES (FMS)97

3. PROJECTED CASHFLOW FOR THE PROJECT..... 104

4. COMMERCIAL PROPOSAL- ABSTRACT 105

5. TERMS & CONDITIONS106



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 Head CPG
 Communication Projects Group, KCC
 Morvija, Thiruvananthapuram-695 583





PART A TECHNIAL PROPOSAL




GOPAKUMAR S P
Head CPG

Communication Projects Group, KCC
Menvila, Thiruvananthapuram-695 583




4



1. INTRODUCTION

Cities are becoming populous day by day. There is an ever increasing number of vehicles on the roads, increase in number of offices and public places etc. which in turn contributes to increase in traffic hazards, crowd gatherings, night travel etc. Citizen safety becomes an utmost priority which demands proliferation in efficiency of surveillance systems which could predict occurrences of undesirable incidents, track/ monitor vehicles and people in real time etc., thus improving the quality of life and security of citizens in cities. Considering the requirements, technology integration and a considerable level of automation becomes inevitable for the sustainability and efficiency improvement of the city surveillance system. This could be achieved by inducing artificial intelligence and analytics capability into smart Cameras across the cities, which would provide centralized information in the form of predictive analytics and real time insights to the authorities.

Undisciplined Driving on roads across the state have resulted in major unwanted accidents causing serious injuries and loss of life which is a very major concern for all state authorities. These accidents that has been the major cause for injury and deaths amongst citizens, has prompted the authorities to look for a disciplined motoring awareness among the citizens, for which Traffic Monitoring and Enforcement is a must.

Speed violations, driving two wheelers without Helmet, non-use of Seat Belts while driving four wheelers etc. are another major cause for fatalities and loss of Human Life. Unauthorized parking in no parking zones is another major issue that affects the traffic discipline in any city. Automated speed enforcement systems which are totally free from human interference is an important element in speed control and an effective counter measure to reduce crashes and accidents.

Safe Kerala Project aims to improve traffic safety and traffic rules/law enforcement by harnessing information gathered from Video and other road-safety sensors posted at various intersections throughout the cities. This involves installing, if not present already, and maintaining the heterogeneous camera and sensor network. In many cities, such networks are already installed and have different levels of autonomous decision making, but in most cases, the decision making process is largely human-driven. The data is/will be too voluminous to be handled by humans, so the processes need to be automated as much as possible, to feasibly monitor road traffic patterns, and develop cost-effective and efficient solutions towards road-safety.

Such automation involves the core machine learning, deep learning, computer vision and data analysis problems of converting unstructured video and sensor data to a structured traffic data to further analyse it for various decision making scenarios, either by the domain-experts or algorithms.

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 KERALA STATE ELECTRONIC DEVELOPMENT CORPORATION

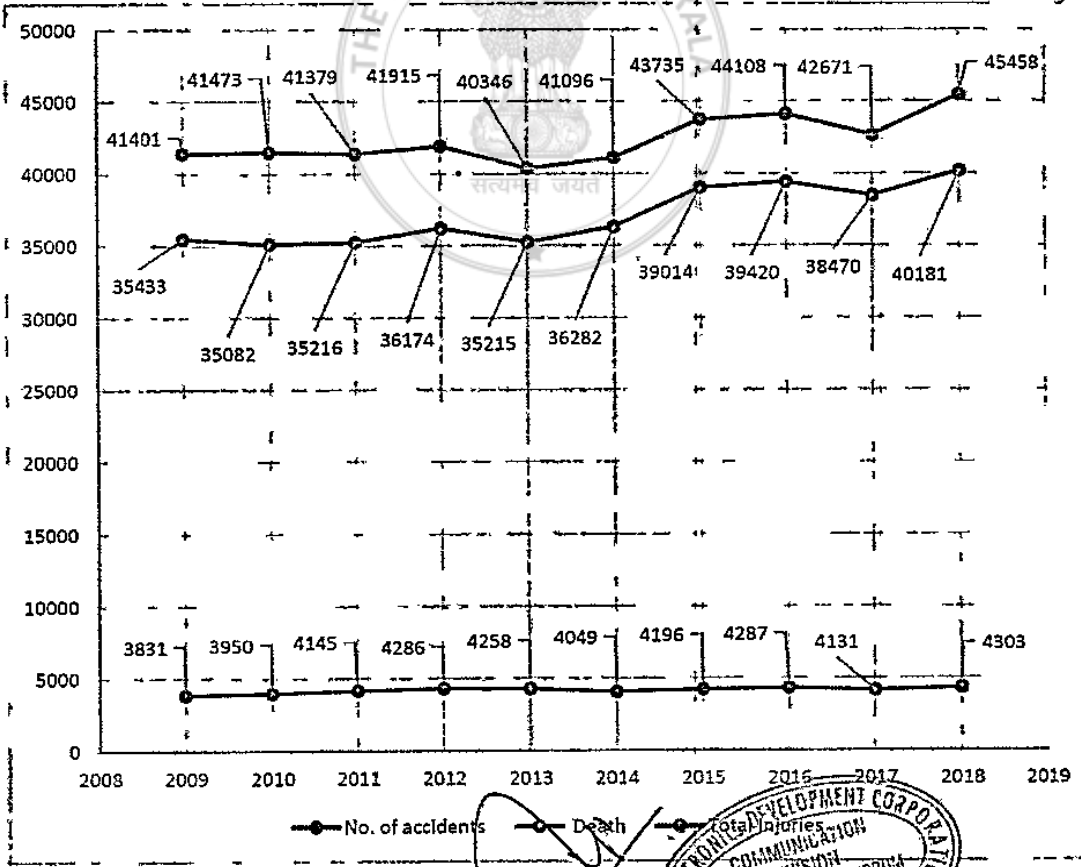
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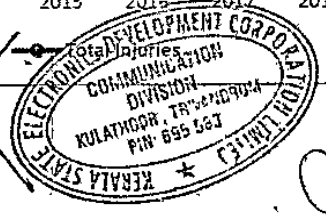
In most cases, the data generated by the citywide networks is unlabeled, so the core problem to address is "identification" (of offences, offending vehicles etc.), so the goal, eventually, boils down to detecting and classifying different vehicles and pedestrians in videos and generating structured data about counts, direction, offences etc.

2. Accident Statistics of Kerala for Last 10 Yrs.

Year	No. of accidents	Death	Total Injuries
2009	35433	3831	41401
2010	35082	3950	41473
2011	35216	4145	41379
2012	36174	4286	41915
2013	35215	4258	40346
2014	36282	4049	41096
2015	39014	4196	43735
2016	39420	4287	44108
2017	38470	4131	42671
2018	40181	4303	45458



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3. PROJECT OVERVIEW

Safe Kerala to be implemented in various cities across the state, is a well-planned initiative from the law enforcement authorities and Government that unites, the working class, businesses, city officials, and law enforcement through a project that is intended to maximize safety of the population in all respects and minimize, road accidents, book offenders, and penalize other traffic offences in the total community. By working together to address these issues, the cities under this project will become a safer place to live in all aspects. In order to provide a good quality of living environment for the citizens, a safe city planning must be implemented which includes identification of hot spot accident areas, improvement of physical environment, transport system, enforcement of traffic rules and appropriate surveillance. The proposed project is a 6 year project with 1 Implementation and 5 year Operations and Maintenance.

The project envisages identification of accident hotspots and placing them under coverage with total AI camera based surveillance, deployment of automated number plate reading (ANPR) cameras, and setting up an Integrated Smart Control Room for the purpose of facilitating the project implementation. By choosing a fully digital integrated surveillance system, the law enforcers can view the happenings in the city from the integrated Control Room and take appropriate measures to curb offences and ensure safety of the citizens.

Safe Kerala project for the various cities, leverages partnerships and technical solutions to help reduce accidents, reduce traffic offences, book and tag offenders, and create an environment where people feel safe and secure to live and work.

AI SMART cameras (incident detection cameras) which are deployed in the city roads use Artificial Intelligence (AI) and can help the law enforcing authorities to detect and identify any offence as detailed in the report. These AI based cameras use state of the art deep learning technology to learn and automatically detect various incidents and report the same to the control room. They are also equipped with IR illuminators, for night detection.

These smart cameras also act as high end high speed ANPR cameras for number plate capture as explained later.

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3.1. Project Components

1. AI based ANPR Camera System:

The system will analyze the Camera output and detect violations & incidents like seat belt violation, helmet violation, usage of mobile while driving, triple riding, wrong number plate, lane change etc. The identified violations will send to Central Control Room and use this information prepare challan against offenders. The system uses AI based ANPR cameras for violation detection on the field, and only violating vehicle images are captures and send to control room for challan processing and fine collection.

2. Red Light Violation Detection System (RLVDS):

The system will identify red light signal violation at Traffic signals and send the court proof images to central control room to prepare court evidence and take further penal action against the offender

3. Fixed Speed Violation Detection System (SVDS)

The system is designed detect and record evidence of over speeding vehicles. Unmanned detection is possible for day and night. It consists of a number of ANPR grade cameras installed at the road, on a cantilever / gantry (Capture Point Units) connected to the Central control room;

Vehicle speed is detected by Sensor like 3D Doppler vehicle tracking radar. The sensors can detect any violating vehicles and give capture command to the camera for capturing images of the number plate of the violating vehicle. Single radar is capable of capturing up to 4 lanes.

4. Mobile Speed violation detection systems

Vehicle mounted Mobile speed enforcement systems, can be randomly positioned at various roads, to capture all over speeding vehicles. Vehicle speed is detected by Sensor like 3D Doppler vehicle tracking radar. The sensors can detect any violating vehicles and give capture command to the camera for capturing images of the number plate of the violating vehicle

5. Parking Violation Detection System (PVDS)

Combination of AI-Smart cameras coupled with associated PTZ cameras can be used for parking violation as described below. Preset Zones can be marked in these PTZ camera images to identify, non-parking areas in a junction. On site vision AI hardware will detect parking violations and these preset View images will be send same to control room. This will result in minimum bandwidth per site.

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6: General Enforcement System using ANPR cameras.

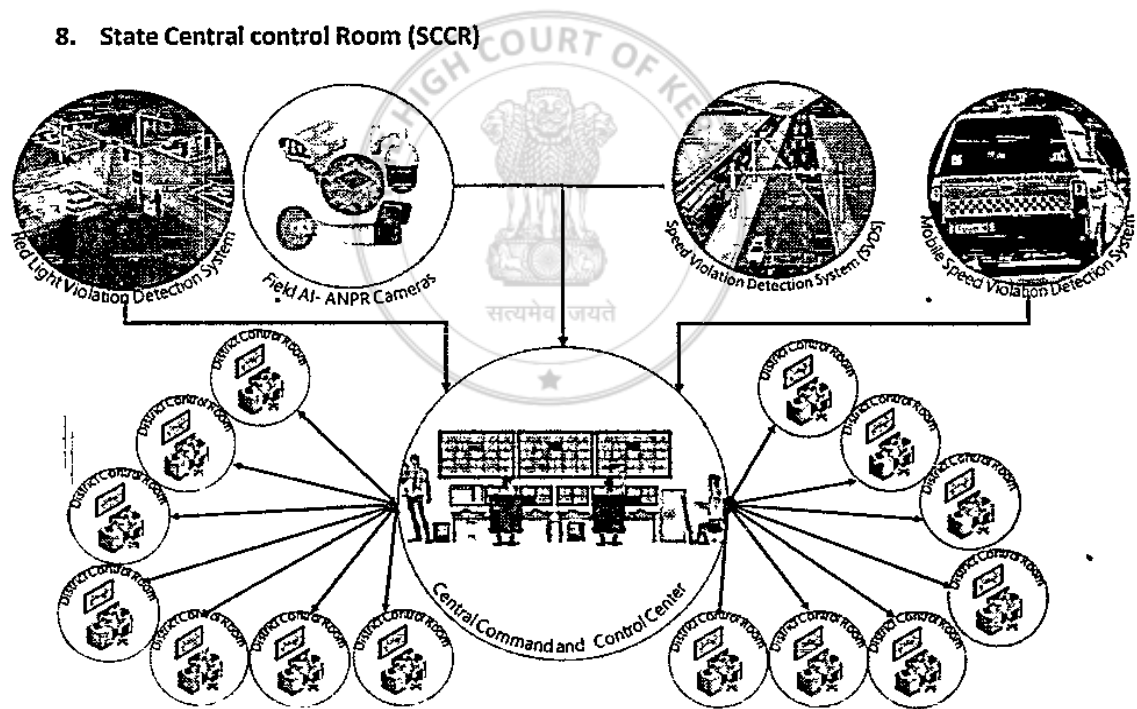
The system will cross check with the non-compliance of various mandates and statutory payments related to vehicles like road tax, pollution certificate, insurance etc. The penalty challan can be generated against such violations by cross checking respective databases.

7: Control Room Management and Challan Processing Software

Control Room Management Software is comprehensive application integrated with all filed systems and offices and officers as part of the Safe Kerala Enforcement System. The system will have full configuration and user role rights management capability. The application will handle all evidence data from various field systems like AI based ANPR cameras, RLVDS, SVDS, Mobile SVDS, PVDS etc.

The application will have ANPR processing and Challan processing capability. The application can integrate other systems by using API.

8. State Central control Room (SCCR)



All field systems described above are connected to one State Central Control Room (SCCR). SCCR has required connectivity, servers, storage & firewalls etc. SCCR will receive all violation data from all field units, Do ANPR operation and further processing. & same will be stored in local storages. SCCR will be connected to 14 District Enforcement Control Rooms as in diagram.

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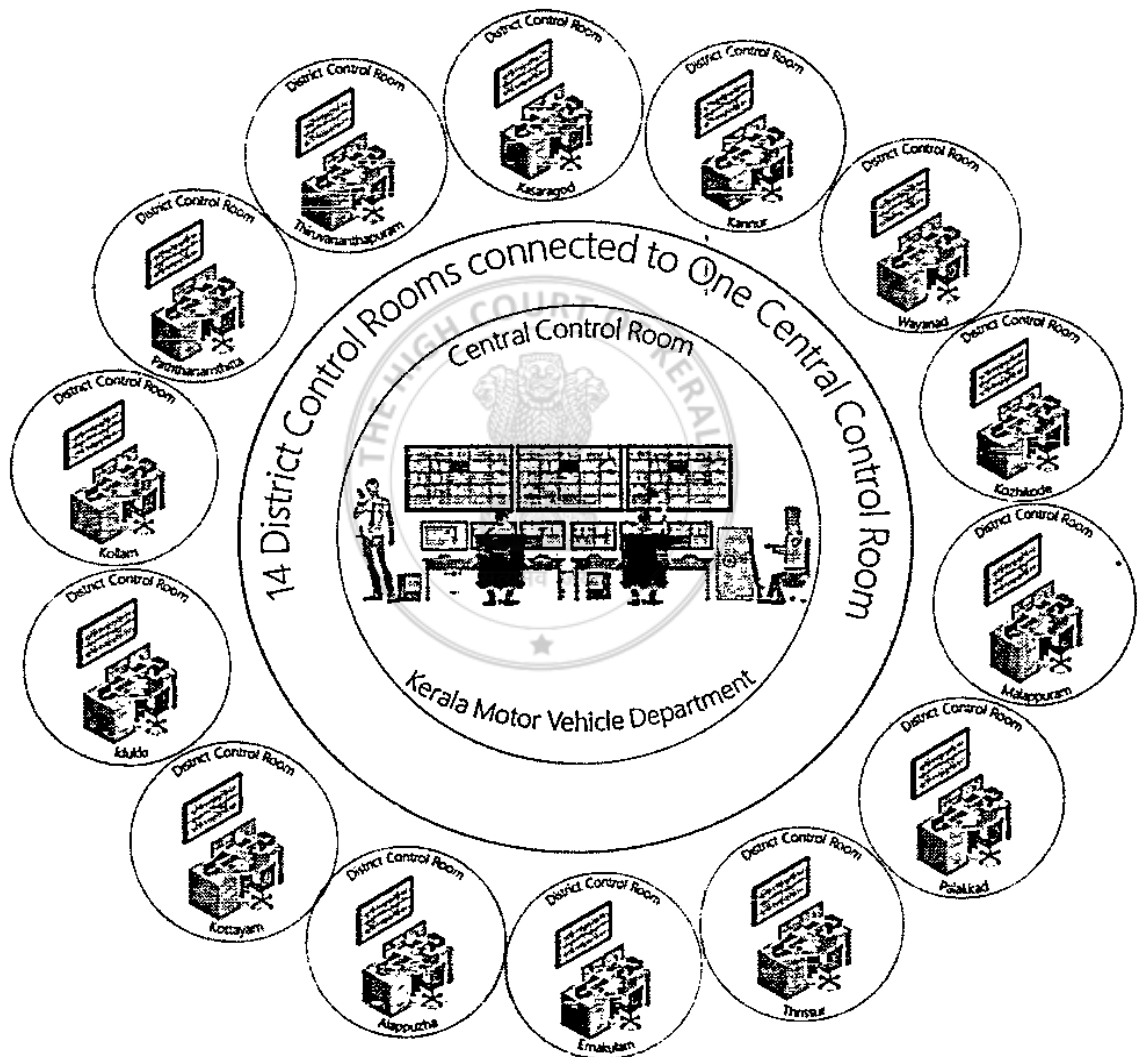


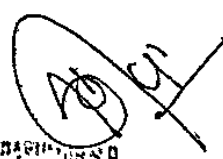


9. District Enforcement Control Rooms (DECR)

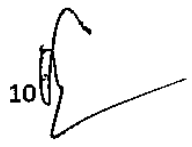
DECR will receive Violation data from SCCR. DECR will have operators to verify the offences and initiate challan processing, printing, dispatching etc. The facility will be equipped with associated hardware & software applications.

Subsequently dispatched challan data will be pushed to payment management service software application for fine collection by cash payment collection / on line payment collection etc.




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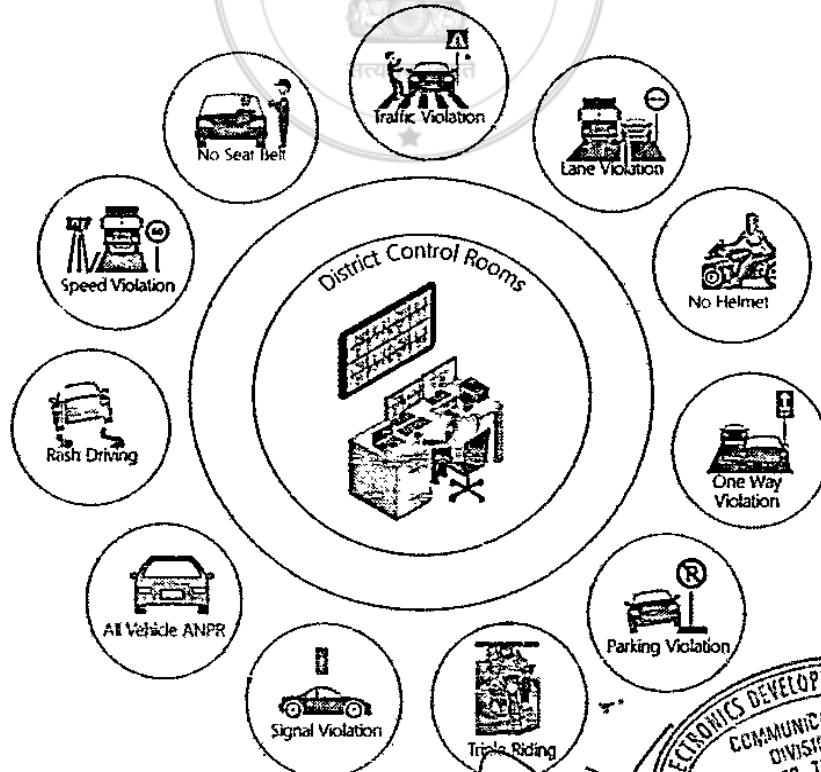
3.2. GENERAL VIOLATIONS

List of violations & Incidents

1. Over speeding beyond set limits
2. Red Light Jumping at Signals
3. Helmetless driving
4. Driving without seat belt
5. Use of Mobile Phones while driving
6. Wrong Entry
7. Illegal Parking
8. Triple riding on two wheelers
9. Vehicles plying without necessary clearances of Pollution etc.
10. Unauthorized vehicles moving on road, in wrong time of the day.
11. Illegal and non-standard number plates

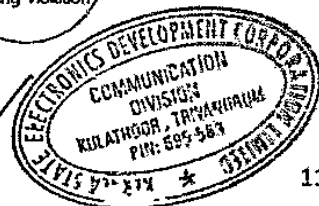
Additional useful information from smart cameras are

- Vehicle crowding, traffic blocks on the roads
- Stopped vehicles on highways (may be due to accidents, breakdown etc.)
- Vehicle classification and counting
- People crowding on roads



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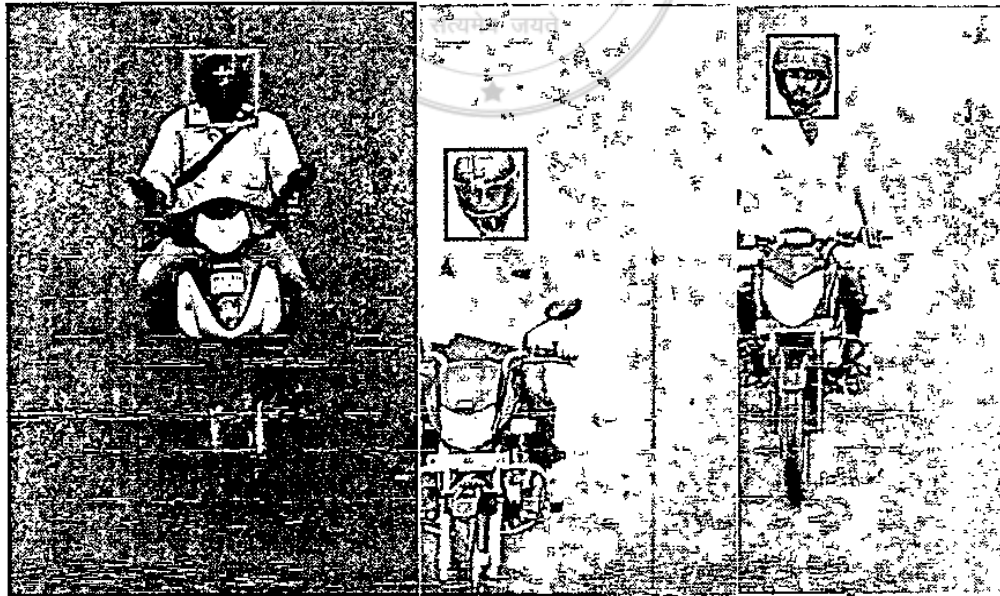
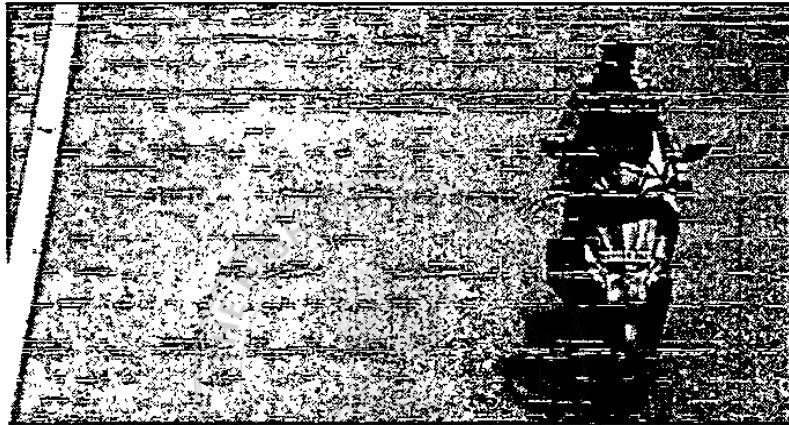
3.3. VIOLATION EXAMPLES :

1. Helmet violation

AI based cameras at site captures images and analyses same for helmet absence detection. Same image also will have vehicle number plate information. Violation data & images are send to CR for further processing.

HELMET VIOLATION CHALLAN

Registered Number	ANPR	Location	Date & Time of Detection	Details
KL-01-BR-2047	KL-01BR 2047A	Location -RI	2018-08-25-16-20-13	No Helmet



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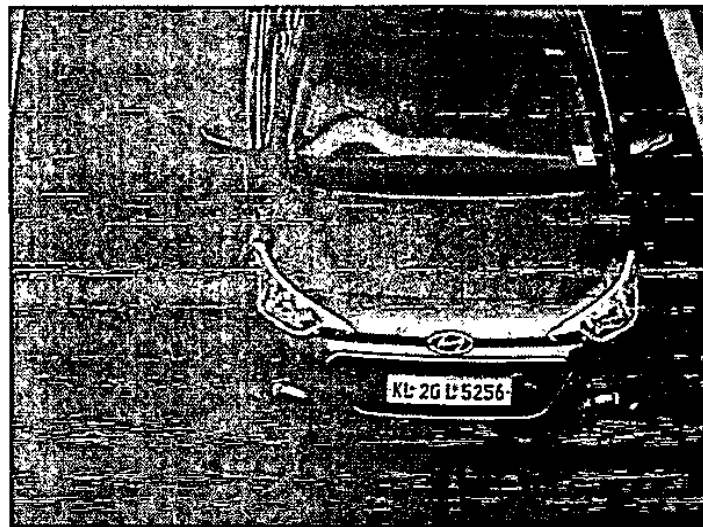


2. Seat Belt Violations

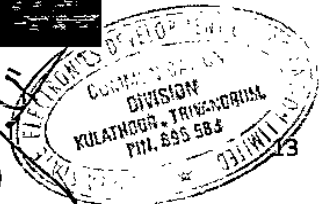
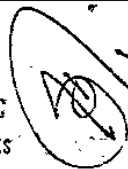
AI based cameras at site captures images and analyses same for seat belt violation detection. Same image also will have vehicle number plate information. Violation data & Images are send to CR for further processing

SEAT BELT VIOLATION CHALLAN

Registered Number	ANPR	Location	Date & Time of Detection	Details
KL-20-L-5256		Location -R1	2018-08-17-17-18-52	No Seat Belt



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Communication Projects
Monvila, Thiruvananthapuram





SEAT BELT VIOLATION CHALLAN

Registered Number	ANPR	Location	Date & Time of Detection	Details
KL-01-AS-4185	KL01AS4185	Location-RI	2018_10_17-20:32:42	No Seat Belt



3. Other violations :

AI based cameras can also detect and classify vehicles moving on road in real time, along with direction. This feature can be used for many type of traffic violation detections. Hence it can detect heavy vehicles moving on road at wrong time of day or wrong lanes. Also wrong way movement of vehicles, non-standard plates etc. can be detected by the AI engine. After a violation detection all Violation data & images are send to CR for further processing

Wrong way violation



Nonstandard plate



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4. AI - ANPR CAMERA SYSTEMS

AI based ANPR cameras is a combination of Global shutter based state of the art ANPR capable camera, Deep learning based AI processing at edge (using AI Vision processor) and other electronic subsystems, UPS, IR illuminator etc.

We are using advanced technologies like Machine learning, Machine Vision, Artificial Intelligence and Deep Learning to build algorithms and detection models to identify specific violations. Our Visual Processing Units are edge devises equipped with highly optimized detection models and algorithms which can process the frames real-time.

These AI based cameras use state of the art deep learning technology to learn and automatically detect various violations & incidents and report the same to the control room.

4.1. VISUAL PROCESSING UNIT (VPU)

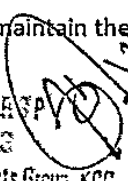
Visual processing Units (VPU) are Low power ARM SoC based industrial compute boards with Graphical Processing Unit (GPU). Visual processing units are interfaced directly to the AI-ANPR cameras.


The VPU will be equipped with Artificial Intelligence/ Machine Learning/ Deep Learning algorithms to analyze the video stream continuously to trace specific type of events. The algorithm in the VPU have trained to identify specific type of suspect events with all supporting data to take further decision. The accuracy of event identification can be improved by using the data which we are capturing from various locations

A 4G module attached along with the VPU board shall provide the band width required for transferring the suspect event to a Central Server.

Figure 1 depicts the high-level data-processing architecture based on the proven big-data paradigm called lambda architecture. Within this architecture, there are several processing pipelines that carry out the various task demanded by a given application for road-transport safety, management and surveillance. Moreover, all such centers are connected to MVD databases for various other tasks, e.g., gathering registration data from such databases for identification tasks following detection tasks.

From the data processing point-of-view, the vision/AI tasks are composed as a data-processing pipeline, wherein each stage of the pipeline executes a low-level task that processes the streams of data. Such a streaming view of data processing is critical to maintain the low-latency, near-real-time nature of the entire solution.


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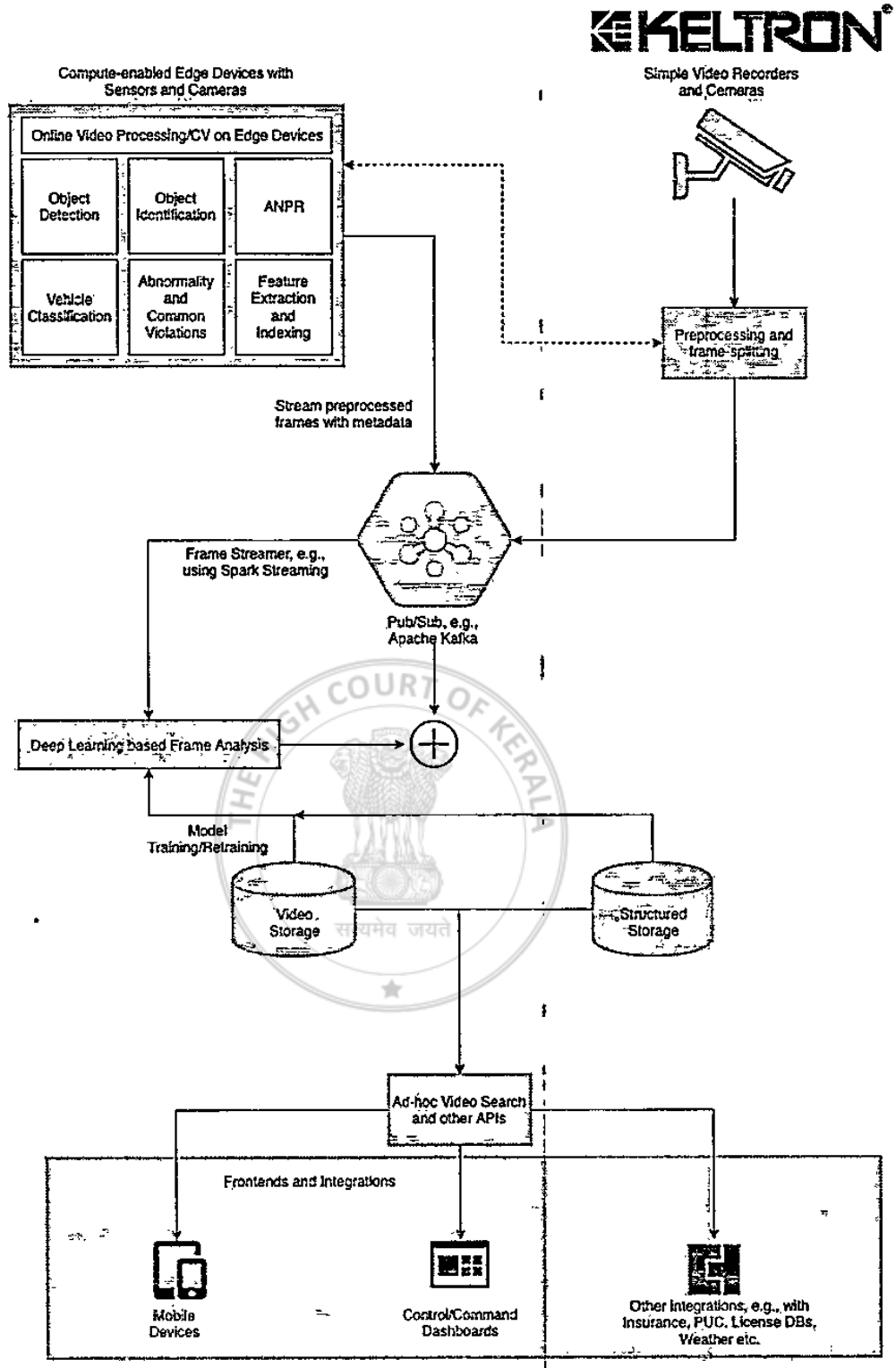
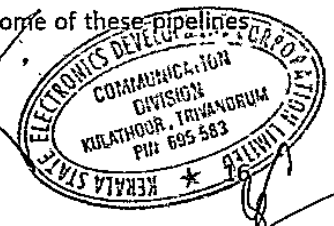


Figure 1. High-level data-ingestion and data-processing architecture

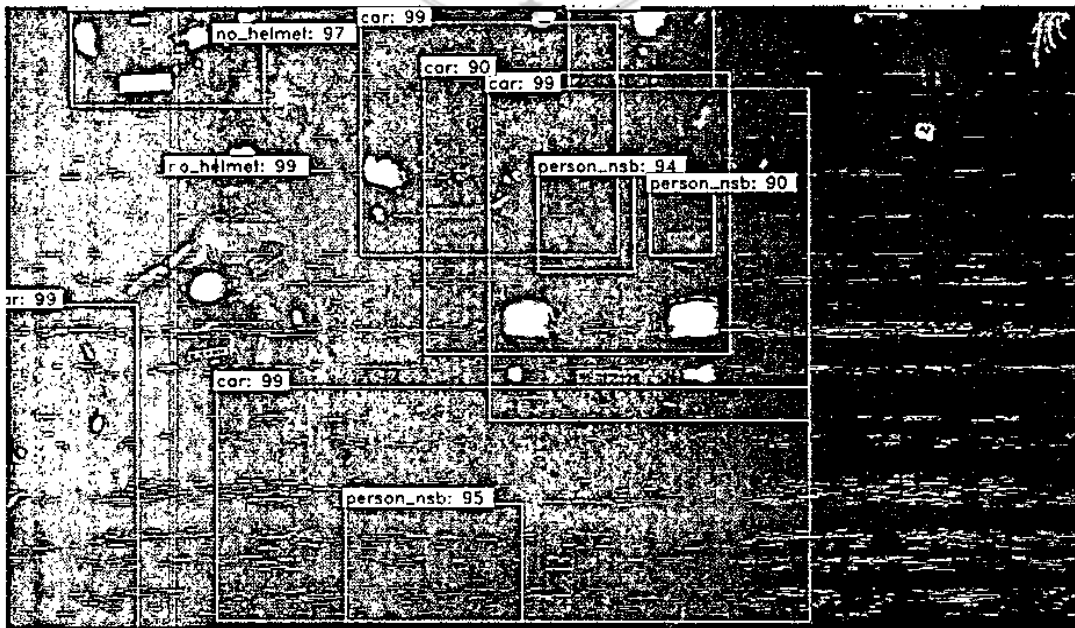
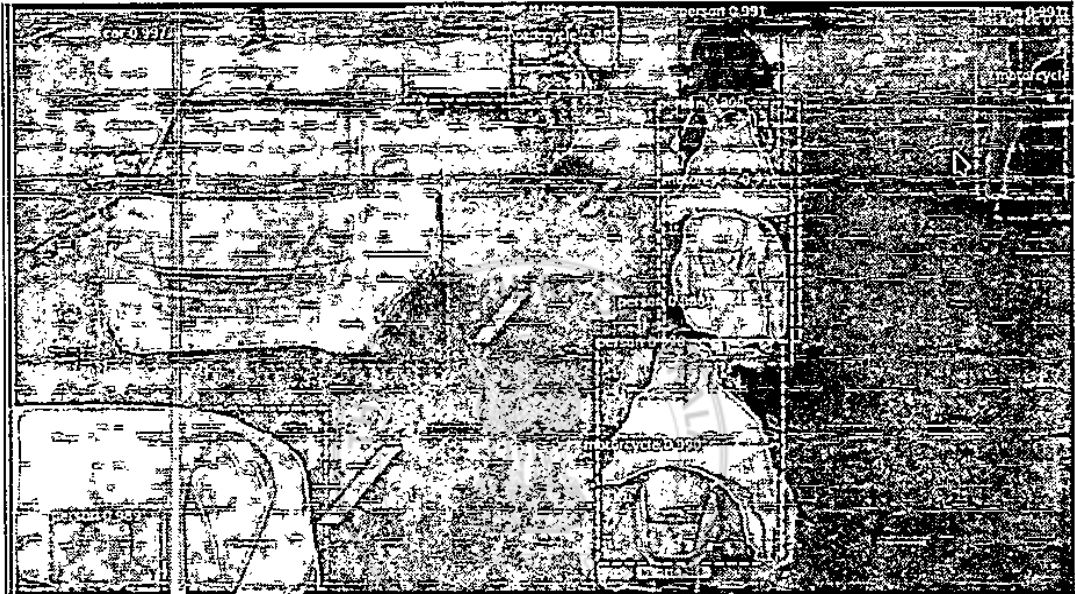
The system consists of several such pipelines for various end-to-end tasks. Some of these pipelines may reside on the edge devices.

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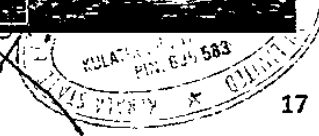


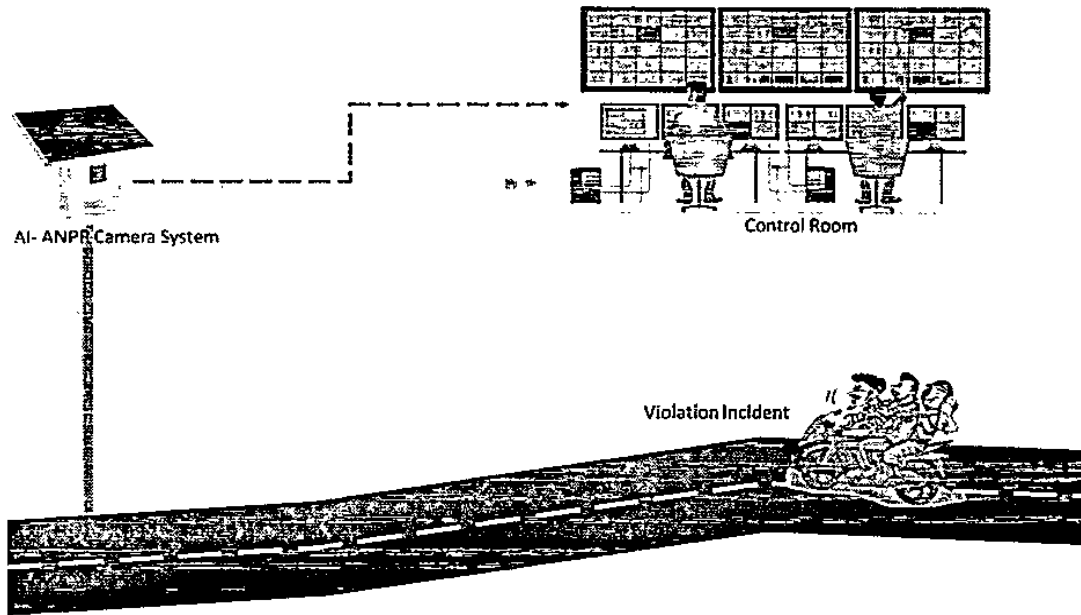
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4.2. ANPR CAMERA TECHNOLOGY

The ANPR cameras use the widely acclaimed Global shutter technology compared to the normal rolling shutter technology used for normal cameras which is mandatory for recognizing and capturing the image of speeding vehicles, which normal cameras are unable to capture clearly. These cameras are designed for both day and night conditions without dependence on any ambient light. The high power Synchronized IR flash for night capture is critical to the fast shutter operation of camera.

ANPR cameras are also able to capture "Two wheeler" number plates, apart from the number plates of normal four wheelers, and are capable of capturing both Normal and Retro-reflective number plates deployed in the country. The advanced technology used in our Cameras helps in avoiding vehicle head light blooming while capturing the image from the front side of the vehicle

These systems are designed to provide more than 90% automatic number plate recognition accuracy, with high quality images. These high quality images are helpful to the law enforcing agencies to identify any vehicle for post crime analysis purposes. Pulsed IR flash enables high quality image capture of fast moving vehicles even beyond 200 KMPH at night time and is in synchronization with the high-speed Global shutter camera

Night time image capture

Pulsed IR flash enables high quality image capture of fast moving vehicles even beyond 150 KMPH at night time. It works synchronously with the high-speed Global shutter camera

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Advantages

- Crystal clear quality images at night, helmet violation detection, crime analysis, hit-run vehicle identification, seat belt violation
- Ultra-low average (actual) power < 10 W.

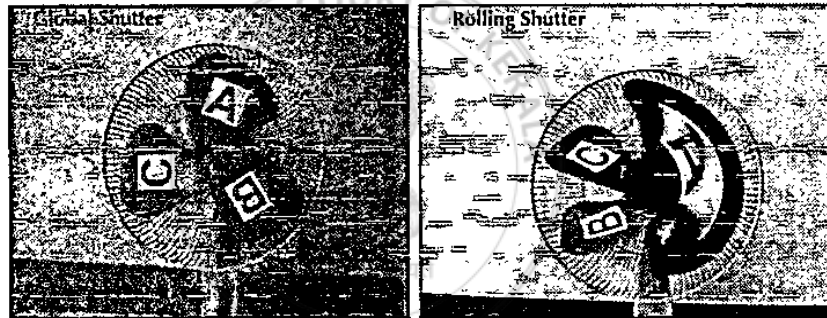
General System requirement for ANPR camera

1. Resolution

Greater than 1920 pixels per lane is recommended for capturing Two Wheeler number plates. Also it is possible to provide partial adjacent lane coverage. Hence 2 Mega Pixel camera with motorized zoom recommended

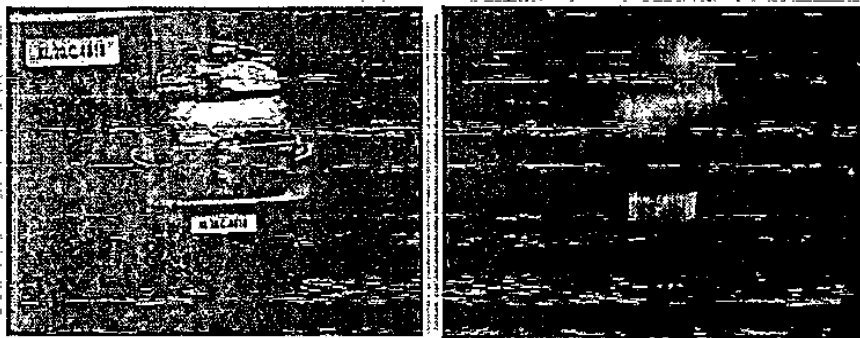
2. Global shutter technology

ANPR cameras use Global shutter technology compared to rolling shutter technology used for normal CCTV cameras (fast moving Fan shown below)



3. Fast Electronic Shutter

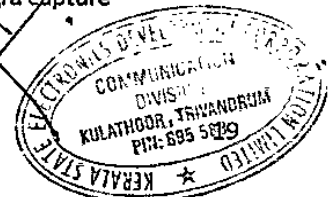
Fast electronic shutter (low exposure time < 1mS) is required to capture even vehicles, moving at > 200 KMPH without any image blur



ANPR Camera capture

Normal Camera capture

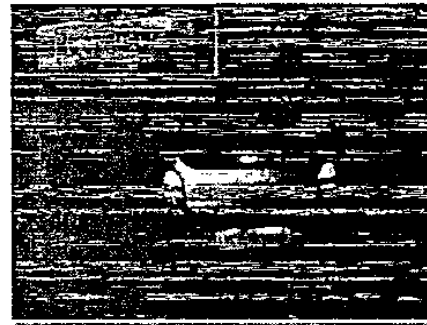
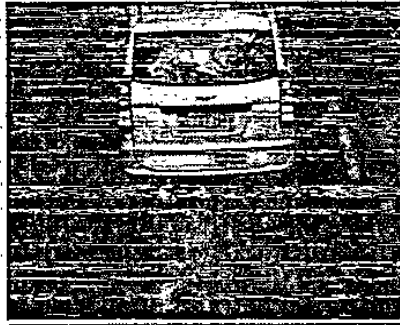
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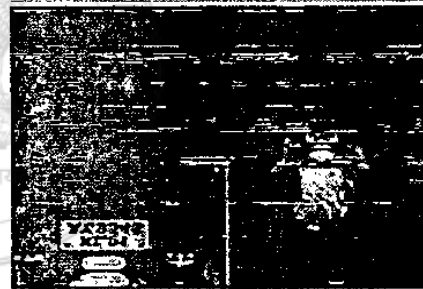
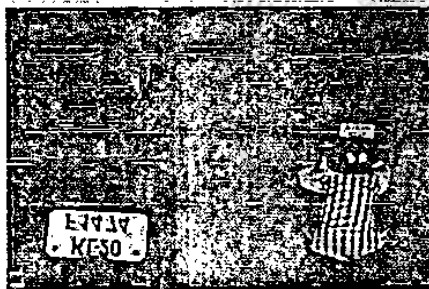
4. Day and Night Condition

ANPR cameras should work for Day & Night conditions without depending on any ambient light. Synchronized high power IR flash (> 500 Watt peak power) for night capture mandatory due to fast shutter operation of camera



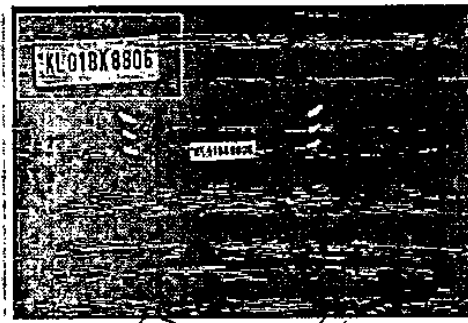
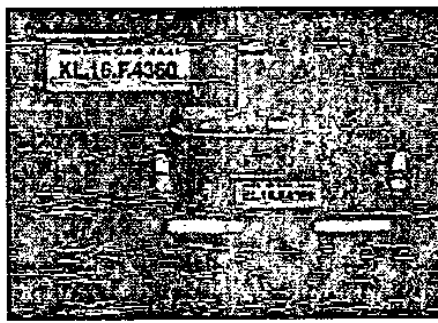
5. Two Wheeler Number plate capture

ANPR cameras are required to capture "Two wheelers" number plate also apart from other vehicles



6. Normal and Retro-reflective number plate capture

ANPR camera is required to capture both "Retro reflective" and "Non-reflective" number plates found in India



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7. Significance of high quality vehicle image capture

If some number plates are not automatically recognized, the number plate images should be available for manual recognition. Vehicle identification by image is also important for crime investigation, hit and run vehicle identification, anti-terrorism



4.2.1. AI - ANPR CAMERA SYSTEM SPECIFICATIONS


<p>ANPR Camera Specification</p>	<p>Resolution: 3, 5 Mega pixel as per requirement</p> <p>Color Images for day, monochrome images for night,</p> <p>True ICR feature</p> <p>CMOS Global shutter sensor</p> <p>Exposure time 10uS-maximum 1 millisecond</p> <p>Trigger out : Global shutter sync flash strobe out</p> <p>Interface: Ethernet, RS 485</p> <p>Lux sensor for Exposure control</p> <p>Video compression: JPEG</p> <p>Sensor: Sony pregius sensor or equivalent,</p> <p>Pixel size: 3.45 micron minimum</p> <p>Equivalent resolution mega pixel lens</p> <p>Vehicle speed up to 200 KMPH</p> <p>Frame rate: configurable</p> <p>Minimum illumination: zero with synchronized pulsed IR flash</p> <p>Capability for radar triggering</p> <p>Power 12V DC nominal</p>
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Monvila, Thiruvananthapuram






<p>IR illuminator Specification</p>	<p>Infrared flash for image capture at night Synchronized flash with global shutter of camera</p> <p>Power in 12V, built in 48 V boost voltage converter</p> <p>Flash strobe input</p> <p>Wavelength: 850nm,</p> <p>FOV: 26 / 36 deg depending on number of lanes</p> <p>Flash power sufficient to capture vehicle images also at night.</p> <p>Capability to capture retro reflective and non-reflective number plates.</p> <p>Peak power up to 300 watts</p>																			
<p>AI- Visual Processing Unit Specification</p>	<table border="1"> <thead> <tr> <th>Description</th> <th>Requirements</th> </tr> </thead> <tbody> <tr> <td>Processor</td> <td>At least 64-bit Quad Core, SIMD ISA capable: SSE4+/NEON CPU with operating freq >= 1GHz, (additional good to have: CUDA-based or TPU or Myriad X based dedicated hardware accelerator for vector ops)</td> </tr> <tr> <td>RAM</td> <td>At least 2GB SRAM (OK, if shared with GPU)</td> </tr> <tr> <td>Networking</td> <td>802.11b/g/n/ac, dual channel (2.4G, 5G), 10/100 MBPS (Gigabit Ethernet), 4G LTE hat and SIM Slot</td> </tr> <tr> <td>Storage</td> <td>On-board flash/eMMC or MicroSD (at least 16 GB in total, MicroSD IO, at least 98mbps)</td> </tr> <tr> <td>USB Ports</td> <td>At least 2 USB2.0 or USB3.0 ports</td> </tr> <tr> <td>GPU</td> <td>Must support OpenGL ES 2.0 at least 24 GFLOPS, with at least 1080p30 H.264/MPEG-4 AVC high-profile decoder and encoder</td> </tr> <tr> <td>Additional Storage features</td> <td>Expandable Storage (through MicroSD / SSD up to 128GB), Anti-tamper with siren shall be part of systems</td> </tr> <tr> <td>OS</td> <td>Linux</td> </tr> </tbody> </table>	Description	Requirements	Processor	At least 64-bit Quad Core, SIMD ISA capable: SSE4+/NEON CPU with operating freq >= 1GHz, (additional good to have: CUDA-based or TPU or Myriad X based dedicated hardware accelerator for vector ops)	RAM	At least 2GB SRAM (OK, if shared with GPU)	Networking	802.11b/g/n/ac, dual channel (2.4G, 5G), 10/100 MBPS (Gigabit Ethernet), 4G LTE hat and SIM Slot	Storage	On-board flash/eMMC or MicroSD (at least 16 GB in total, MicroSD IO, at least 98mbps)	USB Ports	At least 2 USB2.0 or USB3.0 ports	GPU	Must support OpenGL ES 2.0 at least 24 GFLOPS, with at least 1080p30 H.264/MPEG-4 AVC high-profile decoder and encoder	Additional Storage features	Expandable Storage (through MicroSD / SSD up to 128GB), Anti-tamper with siren shall be part of systems	OS	Linux	
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OS	Linux																			



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Solar Power system	Input	
	Operating voltage	10vdc-14.8vdc
	Maximum panel connectivity	150watts
	Panel Voc	22vdc max , 10 A max
	Mppt converter efficiency	85-90 %
	Battery	12.8V-30 Ah, LI FE PO4
	Output	
	Output voltage	5.0 & 12 V dc
	Protection	
	Battery over Charge , under voltage, short circuit	Yes
	Backup duration	24 Hours
DC UPS (For Mains powered use cases)	<ul style="list-style-type: none"> • AC side over, under voltage protection, surge protection • DC power supply - industrial (up to 100W) • DC UPS with 5A charger with Battery protection (over/under) & zero sec change over • output = 10.5-14 VDC: 5V DC out • Battery: 18-40AH 	
Enclosure	<ul style="list-style-type: none"> • Pole mounted outdoor type, with rugged, with Rain canopy etc. All connectors, cables etc. Shall be of industrial grade and any hardware shall be easily replaceable 	
Connectivity	<ul style="list-style-type: none"> • 4G / ADSL / OFC 	

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5. RED LIGHT VIOLATION DETECTION SYSTEM

Undisciplined driving with scant respect for Signals at intersections is one of the major causes for unwanted accidents and loss of life and destruction of national property across the country. RLVD systems are designed to detect any vehicle crossing the stop line when the signal turns Red.

The RLVD systems employ the latest vision sensor technology to provide a high accurate detail of the vehicle jumping the signal.

The system is designed to detect and record evidence of red light jumping by vehicles at traffic signals. Unmanned detection should be provided for day and night.

It consists of number of ANPR grade cameras installed at the road, on a cantilever / gantry and connected to the Central control room. A junction may require one set of cameras for each road of the intersection. The number of cameras on each road could be increased based on the number of lanes. The rear number plates should be captured by the system, in all cases.

The system at each intersection should be linked to the traffic signal lights. Number plates of vehicles crossing the stop line, during red light should be captured. Video analytics could be used to detect vehicles violating the red signal lights.

One common camera should be used to take wide angled shots of all the lanes along with the traffic signal light post. Minimum one wide angle image showing the vehicle violating red signal and the Red traffic signal together should be captured to act as court evidence.

The road side cameras should also be connected to respective high power Infrared flash, for night time capture. The system should also be able to capture clearly both Retro type and Non-retro type number plates which are common in Indian condition.

Most important considerations for RLVD system are,

- ANPR camera capable of capturing images of vehicles including 2 wheelers, retro – non retro number plate capture at night with infrared high power flash Un-blurred high quality vehicle image and number plate image capture, greater than 1200 pixels per lane resolution, global shutter technology etc.
- Red light jumping, stop line violation sensing for vehicles including 2 wheelers, using vide analytics technology.

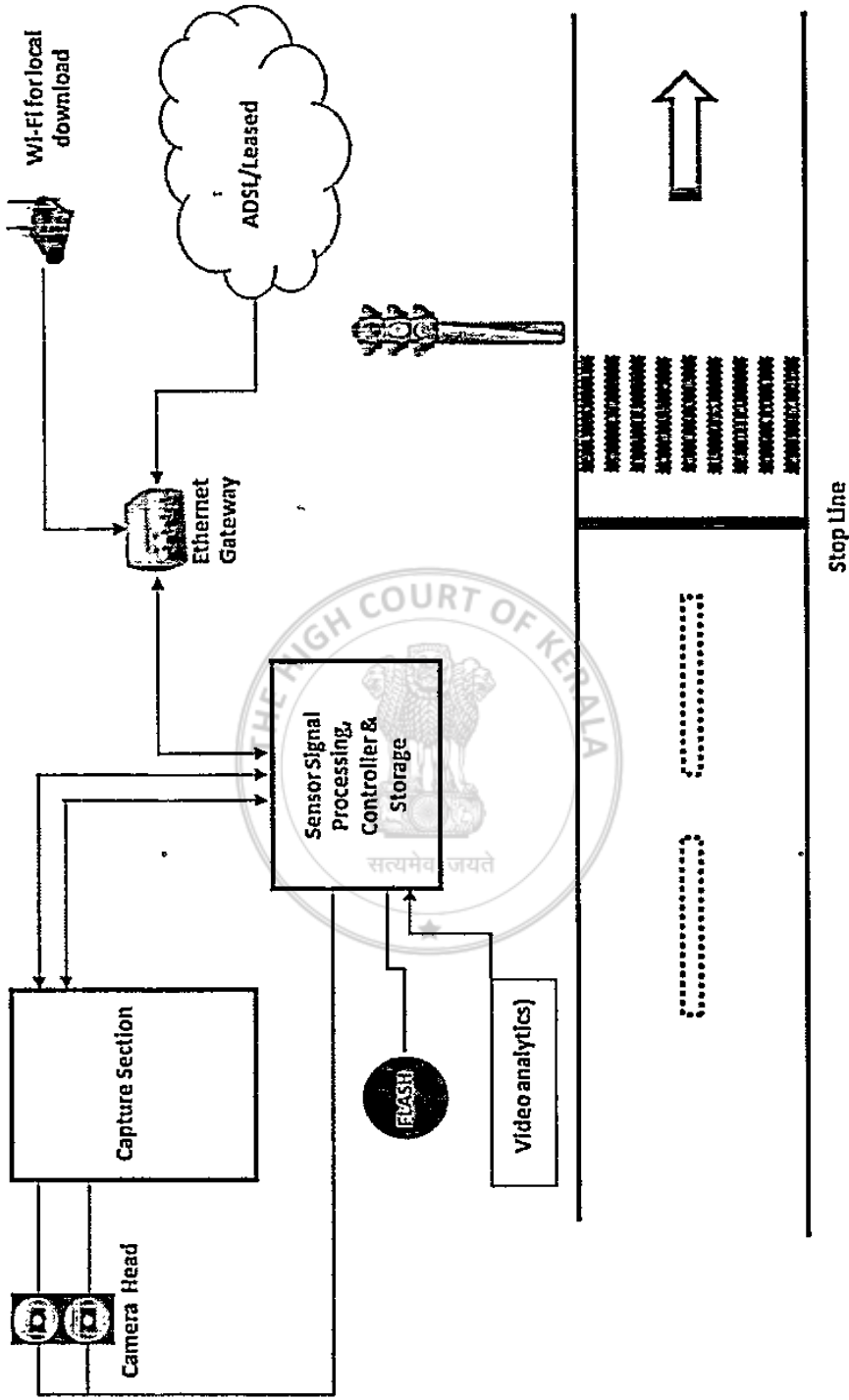
Court evidence camera with one wide angle shots showing Red traffic light and vehicle together

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 KERALA STATE ELECTRONICS & TELECOMMUNICATIONS CORPORATION LIMITED

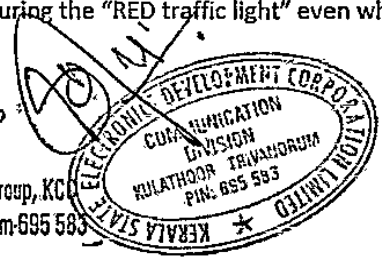


Block Diagram of the RLVDs



Night Time Violation Capture: The system is capable of capturing the "RED traffic light" even when using IR flash at night

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5.1. RLVD TECHNICAL SPECIFICATION

Sl. No.	Category	Specification
1.1	Camera for License Plate Capture	ANPR 2 or 5 Mega pixel camera depending on 1 or 2 lanes (True day and night violating RED signal and stop line in day and night conditions. All types of number plates reflective type and standard type should be captured. Vehicle image also should be captured under all conditions. Image compression JPEG. Connectivity Ethernet. Configuration one 2 mega pixel per lane or one 5 mega pixel per 2 lanes can be used.
		True day & night camera
		Color images for day, monochrome images for night
		CMOS Global shutter sensor
		Exposure time maximum 1millisecond
		Interface: 10/100 base T Ethernet
		JPEG compression, Trigger in, Flash strobe out
1.2	Camera for evidence capture	2 Mega pixel camera (True day and night): one per Road to capture in wide angle image of violation with violating vehicle and Traffic signal. Image compression JPEG. Connectivity Ethernet. Should work for day and night condition, acting as court evidence with red traffic light.
		True day & night camera
		Color images for day, monochrome images for night
		CMOS Global shutter sensor

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26



		Exposure time maximum 1millisecond
		Interface: 10/100 base T Ethernet
		JPEG compression, Trigger in, Flash strobe out
2	Vehicle sensing method	Video analytics, REAR side capture , detection
3	Infrared Flash for Illumination	Infrared flash for image capture at night
		Flash power sufficient to capture vehicle images also at night. Should be capable of capturing all types of number plates, including two wheelers at night.
		Capability to capture retro reflective and non-reflective number plates
4	ANPR (automatic number plate recognition) accuracy	High ANPR accuracy - > 90% for standard four wheeler number plates at day and night,
5	Traffic light interface / visibility	Optically isolated interface. Red signal light should be visible in the evidence camera image along with image of violating vehicle
6	RLVDS Configuration	3 Road, 4 Road Junctions with 2 / 3 lanes per road
7	Power supply	Power input: 170-240VAC,
		DC - UPS for road side hardware with min 3 Hr back up,
		Utility power supply with power meter required at site meeting State electricity board requirements)
8	Protection	Protection against lightning, under / over voltage should be provided (under these condition operation from Battery power is recommended).
9	Camera mounting	Suitable Cantilever / gantry

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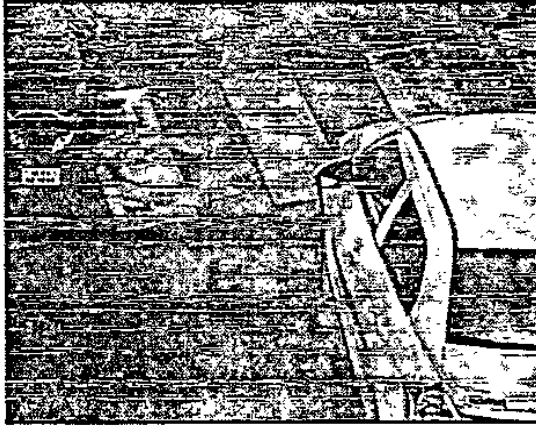
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Sample Challan

ChargeMemo - Red-Light System Violation

Registered Number	ANPR	Location	Date & Time of Detection	Details
KL18Z481		PATTON_RLVDS	2018_09_01_16:02:55	Lane-1



ChargeMemo - Red-Light System Violation

Registered Number	ANPR	Location	Date & Time of Detection	Details
KL01BF7858		PATTON_RLVDS	2018_09_01_16:05:00	Lane-1



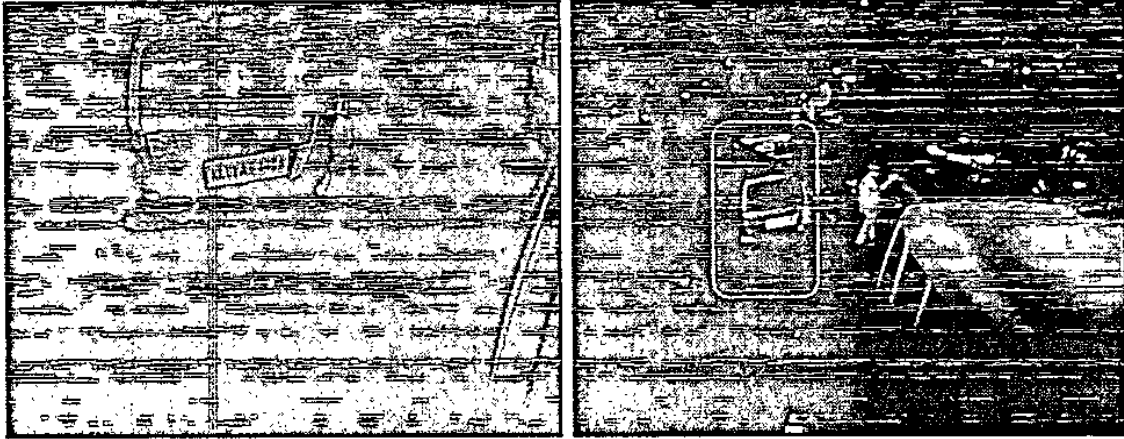
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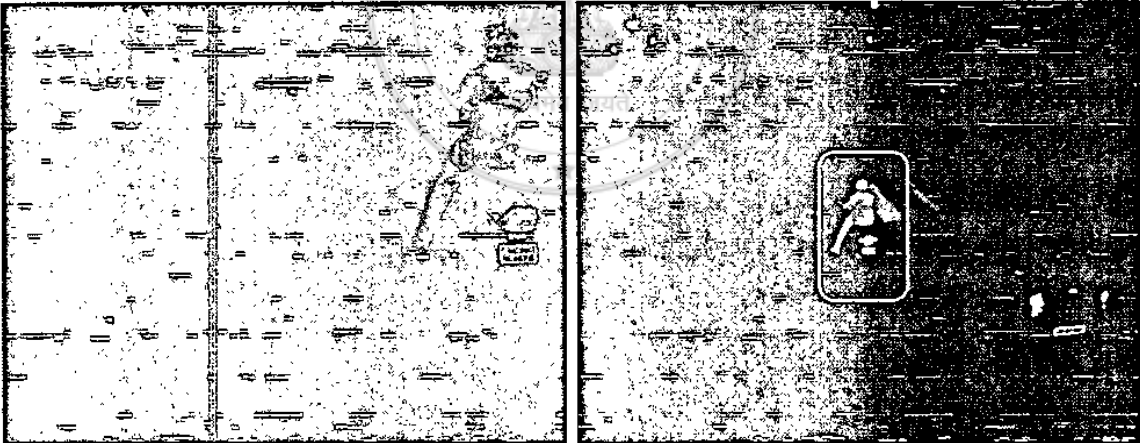
Charge Memo - Red-Light System Violation

Registered Number	ANFR	Location	Date & Time of Detection	Details
KL01AZ4464		PATTOM_RLVDS	2018_09_01_20.14.32	Line-1



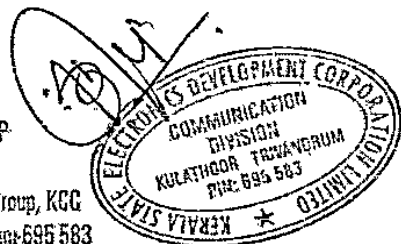
Charge Memo - Red-Light System Violation

Registered Number	ANFR	Location	Date & Time of Detection	Details
KL12NA574		PATTOM_RLVDS	2018_09_01_20.08.18	Line-1



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6. SPEED VIOLATION DETECTION SYSTEM

The Fixed Speed Violation Detection system (SVDS) should detect and record evidence of over speeding vehicles. Unmanned detection should be provided day and night.

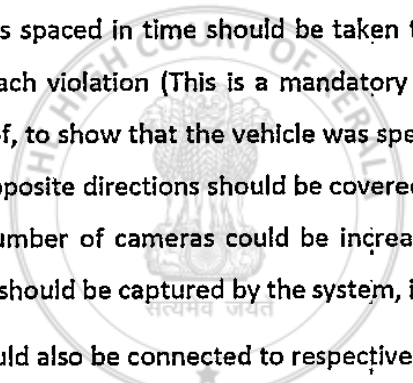
It should consist of a number of ANPR grade cameras installed at the road, on a cantilever / gantry (Capture Point Units) connected to the Central control room. It should be possible for a number of such Capture Point Units to be connected to the same Central control room.

Vehicle speed should be detected by physical Sensors like 3D Doppler vehicle tracking radar. The sensors should detect any violating vehicles and give capture command to the camera for capturing images of the number plate of the violating vehicle. Single radar should be able to capture speed of vehicles on up to 4 lanes.

One common camera per road should be used to take wide angled shots of all the lanes. Two wide angle video shots spaced in time should be taken to prove that the vehicle was moving on the road, for each violation (This is a mandatory requirement for treating the images as Court room proof, to show that the vehicle was speeding on the road). Stretches which have two roads in opposite directions should be covered by two sets of cameras (one for each direction). The number of cameras could be increased based on the number of lanes. Rear number plates should be captured by the system, in all cases.

The road side cameras should also be connected to respective high power Infrared flash, for night time capture. The system should also be able to capture clearly both Retro type and Non-retro type number plates which are common in Indian condition.

The field system should consist of electronics for speed calculation / sensor interface, camera control, control room communication, local storage of violations, Power back up, surge protection, etc. Storage greater than 256 GB should always be provided per road, for buffering violation data, since control room may not be always online.



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6.1. SVDS-TECHNICAL SPECIFICATION

Functional Requirements & specifications	
3D Doppler Radar (1 per road)	Advanced Tracking Doppler Radar - , Detects and measures speed of vehicles. > 240 Km/hour. Refresh Time – .50msec, Multi lane operation. Speed Accuracy better than 97%. Heavy vehicle classification (trucks / Bus etc.) should be possible by Radar.
ANPR Camera for License Plate Capture (1 per lane)	ANPR Camera should be 2 Mega pixel type IP cameras, min HD Mega pixel, True day & night camera Colour images for day, monochrome images for night CMOS Global shutter sensor Exposure time maximum 1millisecond, with motorized zoom lens.
Camera for evidence capture (1 per road)	Evidence Camera (wide angle road view) should be 2 Mega pixel type IP cameras, min HD Mega pixel,, True day & night camera Colour images for day, monochrome images for night CMOS Global shutter sensor, with Lens.
Infrared Flash for illumination (1 per lane)	Infrared flash for image capture at night Synchronized flash with global shutter of camera Wavelength: 850 nm, Flash power sufficient to capture vehicle images also at night. Capability to capture retro reflective and non-reflective number plates.
Violation images.	For each speed violation one lane – ANPR image of vehicle with clear number plate images and 2 evidence images should be captured.
Vehicle image Capture	Along with number plate, high quality image of vehicle, also to be captured at Day and Night conditions for all vehicles. Evidence camera should capture wide angle shot of full road and surroundings with minimum two images of vehicle moving on the road.
Speed Enforcement Method	System should support & enforce both Spot speed and Average speed, ANPR camera captures vehicle image / License plate number, based on trigger from Radar sensor with time stamp and speed

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	information. Accurate time stamp synchronized with GPS or NTP servers required for Average speed enforcement.
All vehicle – ANPR capture Mode	Captures all vehicles passing through the installed location. All vehicle images and numbers are kept in data base for real time alerts / search for crime analysis. Vehicle images should be captured even if the number plate is not automatically detected ,(example: damaged / unreadable license plates or even absence of number plates)
ANPR accuracy	High ANPR accuracy > 90% all around capability for standard or near standard number plates with maximum 1 character error.
Vehicle detection rate (percentage of vehicles captured), classification, Marking	High vehicle detection rate: greater than 95% of all vehicles captured under all conditions, irrespective of number plate quality, in free flow traffic conditions. Also system should be able to classify different types of vehicles.(min 4 types) Violating vehicle should be marked on the image to distinguish between other vehicles.
Vehicle speed accuracy,	Speed measurement accuracy better than 97%, Speed > 240 KMPH. With national or international metrological calibration certificate for speed sensor.
Road side processing hardware and software, storage, network switch	Road side Embedded hardware, network switch etc. Local storage with 256GB or more storage site. All industrial grade hardware should be provided.
SVDS Configuration	2 lanes per road or as required
Power supply	Mains power with lightning protection, isolation transformer & Energy Meter box
Health Monitoring and control. (from control room),	Temperature, battery status, Power supply working status, vibration sensor (Anti tamper with siren) status, Camera status. Remote control of system.
Field Enclosure	Pole mounted outdoor type, with rugged, with Rain canopy etc. All connectors, cables etc. Should be of industrial grade and any hardware should be easily replaceable.
Camera mounting	Suitable Cantilever / Gantry should be provided,


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32 



7. MOBILE SPEED ENFORCEMENT SYSTEM

Standalone fixed speed enforcement systems, even though reduces accidents at the spot has an inherent disadvantage. Once the position of systems are identified, drivers has tendency to reduce speeds at these spots and again speed away.

Mobile speed enforcement systems are usually vehicle mounted and hence can be positioned randomly at any point on the roadsides. This has inherent advantage of capturing more violations, at same time ensuring overall speed reduction of vehicles since position of the system is unknown to drivers. This results in better accident reduction on the roads.

Combining the state-of-the-art modular components, this portable speed enforcement radar system gives you the opportunity, freedom and flexibility to enforce speed limits automatically at any location for any set speed.

The state of the art Automatic Mobile SVDS, is an ideal solution to this requirement, to fully track and capture images and number plates of speed violating vehicles moving in a stretch.

These Speed measurement devices are to be installed on normal vehicles with slight modification. This allows enforcement authorities to measure speeds of vehicles passing the designated area, with the enforcement vehicle parked alongside the road. The speed enforcement system will be integrated without altering the appearance of the vehicle, thus avoiding recognition.

The unit comprises a 3D Doppler radar capable of tracking two lanes, with an accuracy of 97% up to speeds of >200 kmph. The infrared Flash unit used can capture images at night and the entire unit operates on 12 V batteries. These can also be tripod mounted as required.

Features:

- Speed accuracy >97% using 3D Doppler Radar
- Single radar covers up to 2 lane
- International speed calibration certification
- Min 2 Mega pixel high resolution ANPR camera
- Capable to capture both retro & non-retro reflective license plates.
- Marking on image for identification of violated vehicle

3-D Doppler radar Technology

State-of-the-art technology used – better than 97% accuracy (German/US make Radar used – “Swiss Federal Institute of Metrology METAS certified”)

Capable of tracking multiple vehicles simultaneously

Vehicles moving within the radar lobe are tracked and their movements / speed analyzed.

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Concepts & Projects Group, KGL
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7.1. MOBILE SPEED ENFORCEMENT SYSTEM SPECIFICATION

Sl. No.	Category	Specification
1	Doppler Radar	Advanced Tracking Doppler Radar - , Detects and measures speed of vehicles. > 200 Km/hour. Refresh Time – 50msec, Multi lane operation. Speed Accuracy better than 97%. Heavy vehicle classification (trucks / Bus etc.) should be possible by Radar.
2	Camera for License Plate Capture	Camera minimum 2 Mega pixel total resolution, True day & night camera, min 2 lane coverage
		Color images for day, monochrome images for night
		CMOS Global shutter sensor
		Exposure time,maximum 1millisecond
		Interface: 10/100 base T Ethernet
		JPEG compression, Trigger in, Flash strobe out
3	Infrared Flash for Illumination	Lens: Mega pixel or better, Day & night, IR corrected, lens. Motorized zoom, focus preferred.
		Infrared flash for image capture at night
		Synchronized flash with global shutter of camera
		Peak pulse power >400 watts, Average power < 25Watts
		Wavelength: 850 nm, Flash power sufficient to capture vehicle images also at night. 40 deg. angle
4	Image brightness, contrast control	Capability to capture retro reflective and non-reflective number plates.
		The method of gain, exposure control should give optimum image quality under all conditions, 24x7, under all conditions of illumination, independent of road orientation.
9	Vehicle speed accuracy,	Speed measurement accuracy better than 97%, Speed > 200 KMPH. With national or international metrological calibration certificate for speed sensor.
10	Vehicle Marking	The captured vehicle will have marking on image for identification of correct vehicle.

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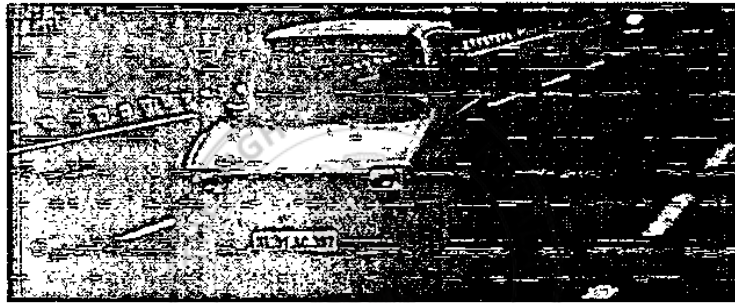
34



11	Road side processing hardware and software,	Road side Embedded hardware, Local storage with 240 GB or more storage site. Industrial grade Network switch (0-60 deg. C), 10/100 base T.
13	Power supply	Runs on Battery
15	Camera mounting	Vehicle mount

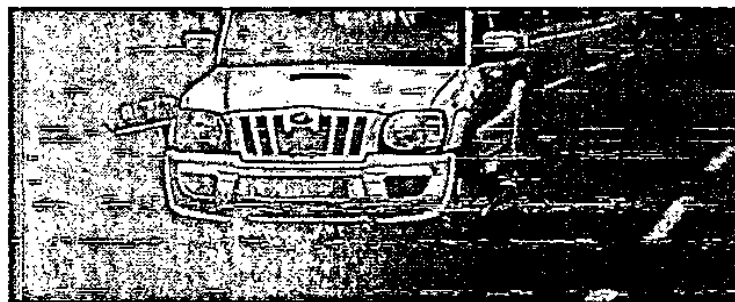
MOBILE SVDS-VIOLATION CHALLAN

Registered Number	ANPR	Location	Date & Time of Detection	Details
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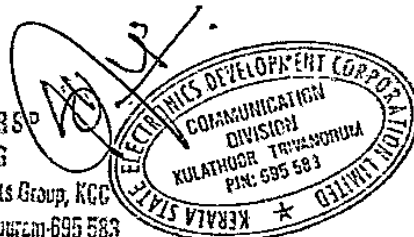
MOBILE SVDS-VIOLATION CHALLAN

Registered Number	ANPR	Location	Date & Time of Detection	Details
KL-01-AX-2898		Location-R1	2018_10_17-17:30:41	Over Speed



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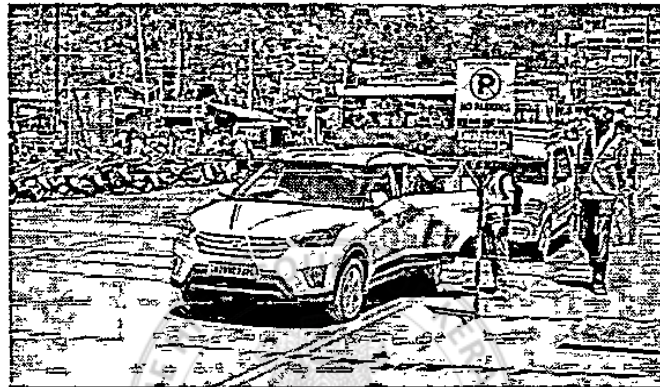




8. PARKING VIOLATION DETECTION SYSTEM

Parking Violation Detection System (PVDS) Combination of AI Engine and associated PTZ cameras can be used for parking violation as described below.

- Preset Zones can be marked in these PTZ camera images to identify, non-parking areas in a junction.
- On site vision AI hardware will detect parking violations and these preset View images will be send same to control room. This will result in minimum bandwidth per site.



8.1. TECHNICAL SPECIFICATION OF PVDS

PTZ camera for Parking violation system	Image Sensor	1/1.9" large area progressive scanning CMOS sensor or Better
	Aperture/Focal Length	F1.5~F4.3, f=4.3~129mm / F1.5~F4.8, f=6~180mm
	Optical zoom	30X or Better
	Digital zoom	16X or Better
	Focus	Auto/Manual
	Shutter Speed	Auto, Manual (adjustment range PAL: 1/1 to 1/32000s or Better
	Video compression	H.265, H.264 switchable M-JPEG independent encoding
	Encoding Capability	1080@60fps

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36



Alarm Port	2 input, 1relay out
White Balance	Auto/Manual/Outdoor
WDR	Supports multi-frame composite pattern wide dynamic with a range up to 120dB
S/N Ratio	>55dB
Noise Reduction	3D
IR Lamb	Built-in
IR Wavelength	850nm
IR Illumination Distance	100m
Presets	512 or Better
Patterns	12 or Better
Autopans	12 or Better
Tours	16 Groups (each tour can be associated with 14 acts, including preset 1~32, pattern 1~4, autopan 1~4)
Timing Tour	Shall be available
Onvif	ONVIF Profile S
Web Server	Shall be available
Network Port	1 RJ45 10M/100M self-adaptive Ethernet port
Mirroring	Horizontal, vertical
Manual Horizontal Speed	Pan: 0.1° ~1000°/s
Preset Speed	400°/s (max.)
Pan Travel	360° continuous
Tilt Travel	0° ~ 180° (auto-flip)
Input Voltage	24VAC/24VDC self-adaptive

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	Power Consumption at Idle Condition	<17W (max. Idle Condition)
	Power Consumption	<63W (max., heater on, IR lamp manually adjusted to Maximum)
Visual Processing Unit	Hardware Specification	Same as AI – ANPR Camera VPU
	Detection Model and Software License	Parking Violation detection AI model and software license

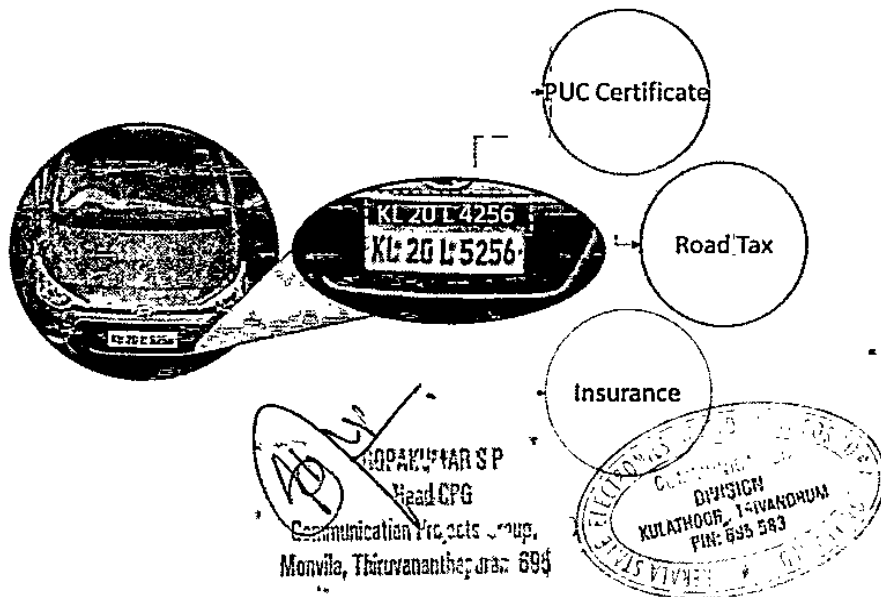
9. GENERAL ENFORCEMENT MANAGEMENT SYSTEM

Since all above systems captures vehicle number plate information also, other type of violations can also be detected as below.

Since the Control Room software application is integrated with MVD / VAHAN database, it is possible to verify the following type of violations,

- a) Valid Pollution test report
- b) Valid Insurance
- c) Tax dues
- d) Valid permit
- e) Vehicle type, make etc. corresponds with database information.

This will be additional revenue for the department.





10. CONTROL ROOM MANAGEMENT SOFTWARE

The Central Command and Control Centre shall be the central database of Motor Vehicle Department. Across in the state of Kerala, there will be more than 1000 units of AI-ANPR Camera with Edge AI devices connected with 4G network and solar power ups. The number of filed devices can be increased further. Camera video stream will be analyzed by Edge AI devices in real time. The system will perform the analysis day and night. Identified incidents will send to central database. The entire incident data capturing and enforcement application will be hosted in the Data Centre. Events from each camera location with supporting metadata will come to Central Data Centre with proper indexing. The data shall include the evidence against each incident from each camera location.

BASIC functions - SCCR

- All violation data from field hardware (AI- ANPR cameras, RLVD, SVDS etc.) directly downloaded to SCCR servers & storage.
- Any subsequent automatic processing of data like AI & ANPR will be also carried out in central servers.
- SCCR has back up devices, high speed connectivity and power backup suited for 24x7 operation.
- ALL subsystems are designed with 100% redundancy for fail safe, uninterrupted operation.
- Violation data with images available in SCCR can be downloaded by District Enforcement Control Room for verification, printing & dispatching. Processed challan data is pushed back to SCCR for archive and for transferring to payment management software.

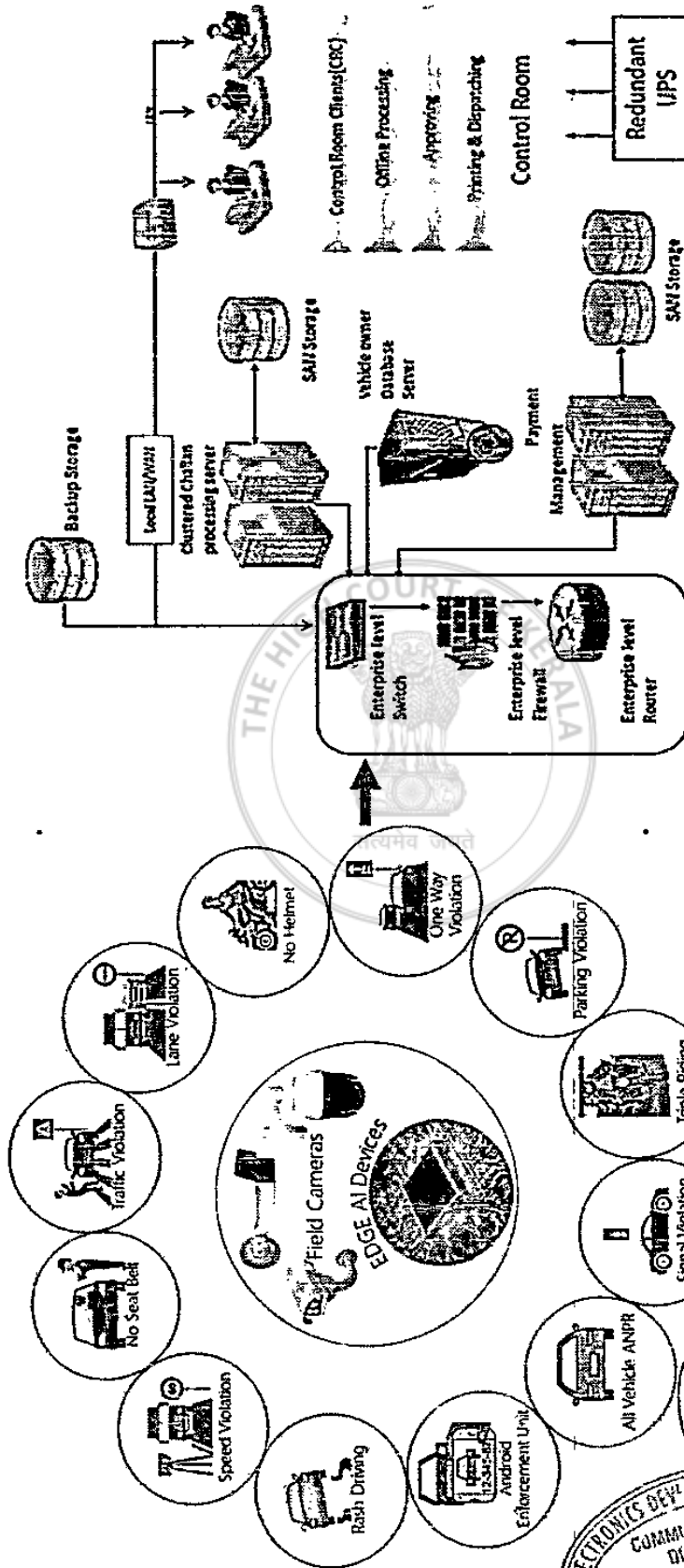
BASIC functions -DECR

- There will be 14 district enforcement offices across Kerala with client terminals & operators.
- Violation data from SCCR can be downloaded to the client terminals using a web interface.
- Operators perform verification of challans and approving of same with supervision of MVD officials.
- Extracting vehicle owner address from MVD data base also happens in DECR.
- Approved challans are printed and dispatched by email and post. SMS notifications are also sent to violators. It is also possible to get required violation reports.
- Once challans are sent for fine collection, same data is automatically passed to payment management module, for fine collection and accounting.
- Overall operational scheme is presented below

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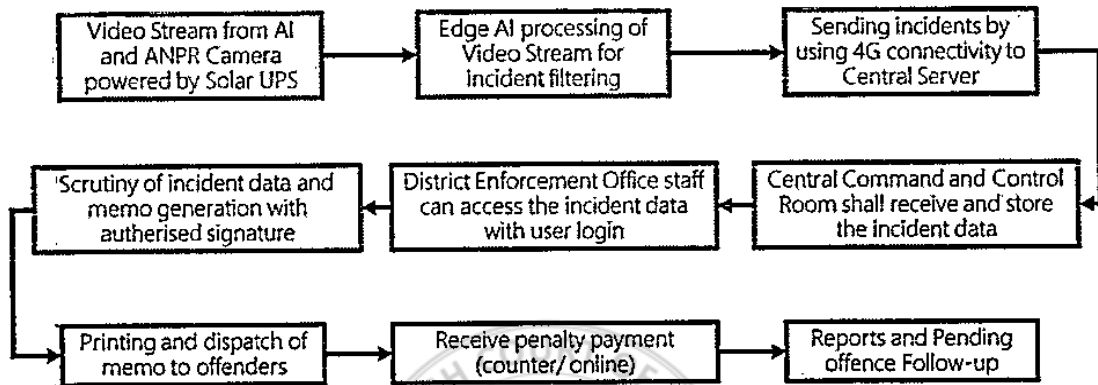


10.1. CHALLAN PROCESSING SOFTWARE

Overall challan processing flow:

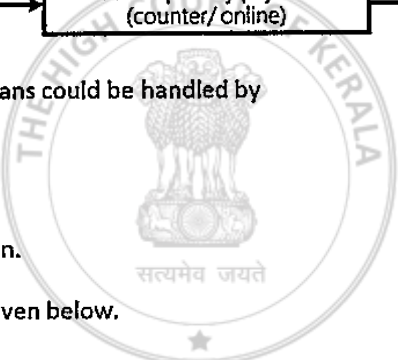
Once a traffic violation has occurred, the violation images and data should be sent to control room from the field hardware on the road.

The Violation memo / Challan processing software should be capable of preparing the charge memo / Challan and printing the same for dispatching to the vehicle owner.



The Processing of offence challans could be handled by

1. Operator
2. Approving officer
3. Challan dispatch section.



The process flow could be as given below.

Server periodically downloads offence data from the field units as programmed / scheduled. Vehicle numbers from the number plates are extracted automatically by ANPR software. The Operator views them and does any correction if required.

Corresponding to vehicle registration number, vehicle owner data base is required for offence processing, which could be obtained from the motor vehicle department server, with suitable software interface.

At DECR, once challan is ready for approval, and the challans are moved to the server under proper database category. Challans that cannot be processed, can be moved to a rejected database with reasons for the same.

The Officer authorized to approve the challans (using User Name / Password specific to the officer,) views the challans, approves them, and marks them for fine collection. The data goes to 'approved'

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category database. (These challans cannot be further modified by any other Operator / person). The Officer can also reject any challan if required).

The Operator prints and issues the authorized challans and takes hard copies as required. He also issues same to offender by email/ post. All issued challans are then moved to server database under Category 'Issued'.

Once challans are issued, the same data is moved to Payment management software / server for payment collection processing.

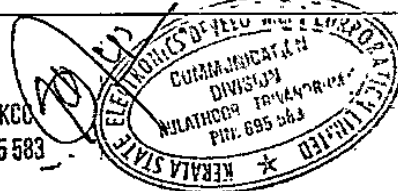
Possible Offence Details from the violation processing system

Unique ID of Challan , Date and time, Number plate image, (day / night with flash) , Registration number, address of owner, Court evidence images, Location Name and lane number, MVD rules, Fine to be paid, last date etc. any other details of violation, etc.

Functional requirements: Challan Processing software

Sl. No.	Category	Specification
1	Violation memo Format	There will be violation images with evidence images or sequence of images along with violation report. Minimum one image with Vehicle License plate visible clearly. Also should have information like date, time of offence, location ID, Violation ID, speed; Violation details , Motor vehicle applicable Law/ Act, fine amount, due dates, etc.
2	Violation processing Software	Automatic download of captured violations by server software from multiple locations should be possible. There should be Automatic Number Plate recognition by System Software while downloading
		Configure the capture stations – It should be possible to perform Machine ID Settings / Sensor / Flash / Camera Parameters / Date & Time / Connection Parameters / Access Settings, etc. through system software running on the server
		User should be able to use any standard web-browser to access violations downloaded by the server software
		Options for penalizing and dispatching violations should be available. Also, it should be possible for the Megapixel image to be zoomed/ processed by user for creating Challan
		It should be possible for the Challan format to be modified according to the project/ system requirements

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		User Management – It should be possible to create Multiple user ID for using the Challan Processing Software and set the privileges.
		It should be possible to get vehicle/owner information from State Motor Vehicle database and embed it into the Challan
		Challan data information should be customizable. Settings should be provided for changing Fine Amount, Header, Footer, Logo, Challan Printing Office etc., for Administrator privilege
		Various reports like Search Vehicle, User's Report, Violation Analysis Report, Dispatch Report, System Events Report etc., should be available

10.2. PAYMENT MANAGEMENT APPLICATION

Payment management system should be a state / city wide web based system that automates the process of fine collection by the Authorized Department, for offences committed by vehicle owners. Its server computer should be located at the central control room.

Suitable NIC – Vahan solution can be used as available.

Two modes of fine payments are possible,

- Fine can be collected by designated cash counters at various police stations / offices across the state / city.
- Fine can also be collected by internet electronic payment using debit / credit card or bank transfer & mobile wallets.

Once a traffic violation has occurred, challan is prepared and sent to the vehicle owner, by the Challan processing software as described in section 6.1. Corresponding "Fine payment to be collected information" is subsequently sent to the payment management server running payment management software.

Cash Payment Collection

Cash payment collection could be as follows:

The offender comes to the cash counter of any of the authorized offices in the state and remits the fine, with help of a web connected PC linked to central Payment management server. An online receipt is also printed by the central server, once cash has been received.

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The total collection received as fine every day is remitted in the bank/treasury by the collecting officer. A Challan number received from bank/treasury for each remittance is entered in to the Payment System software for reconciliation.

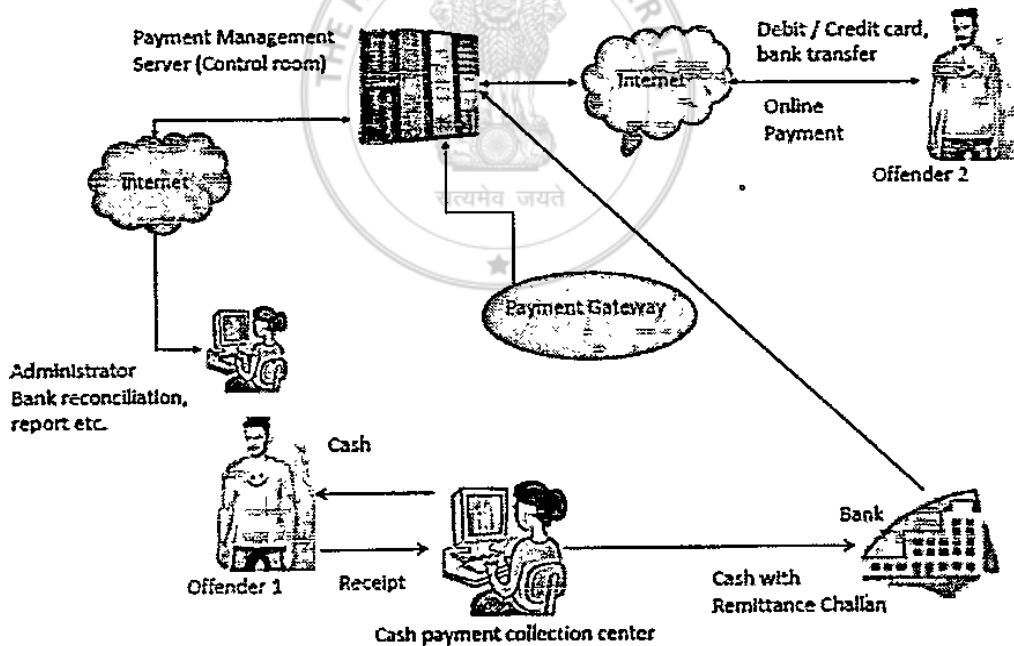
During each fine collection, the details of the driver involved in that particular offence (given by the vehicle owner) are also entered into the Payment System software.

If the offender does not remit the payment in the stipulated time, one or more reminders should be sent to the offender. If he/she still does not pay the fine after a prescribed number of reminders, the case should be recorded as 'Non Remittance'. Such cases are included in the list of offences to be submitted in the court.

Various reports on all the activity like daily collection per office, amount remitted in bank etc. should be available for viewing by the administrator.

Online Payment

There should be a provision for online payment through internet from home using Debit card / credit card payment through a Payment gate way like Bill desk.



In the case of Credit Card or Debit Card payment the Payment Gateway software should act as a middleware connecting the PMWA and the Core Banking software of the bank that issued the offender's Credit or Debit card. In the case of Net Banking also it should act as a middleware between the Core Banking software of the bank in which the offender has account, and PMWA.

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Functional requirements of Payment management software (PMS)

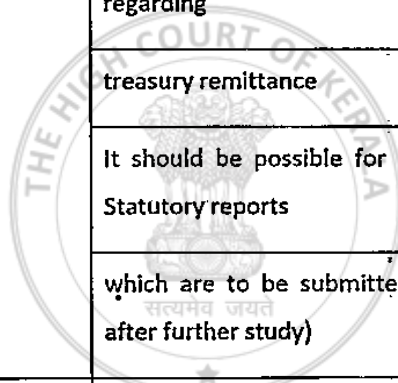
Sl. No.	Category	Specification
1	Payment Management Software	Web based software application, should include both Cash Counter and Online Payment modes
2	General Requirement:	Should be a highly secured multi-level Authorization and Authentication system
		Should have Data security through Encryption
		Should use Secured Socket Layer for financial data transfer through internet
3	Cash collection management software:	It should be possible for the Administrator to create username and password users with different privileges, and assign type of privileges as required
		It should be possible for the users to manage the system from their terminals using their username and password, according to the powers assigned to them
		It should be possible for the Administrator to back up the data at a particular interval
		It should be possible for the Administrator to get report on cash collected on daily basis for any cash collection location or for all locations
		Data received from challan processing software should include, (XML File).
		1. Unique Chelan Id.
		2. Vehicle registration number.
3. Name of the registered owner.		

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	4. Address of the registered owner.
	5. Location of Offense.
	6. Offense Type and its nature.
	7. Date and time of detection.
	8. MVD Rules.
	9. Fine Amount.
	10. Details regarding violation.
	It should be possible for the Administrator to get reports regarding treasury remittance
	It should be possible for the Administrator to get the Statutory reports which are to be submitted to the government.(Details after further study)
	It should be possible for the Administrator to get MIS Reports for periodic reviews and for statistical purposes. (Details after further study)
It should be possible for the Administrator to generate reports of total charge memos received, paid / non – paid cases and send reminders for payment non – collected cases.	
This software should also print receipt for each collection with details as below, Unique Chelan Id, Name of the registered user, Fine Amount, Date of Payment, Mode of	

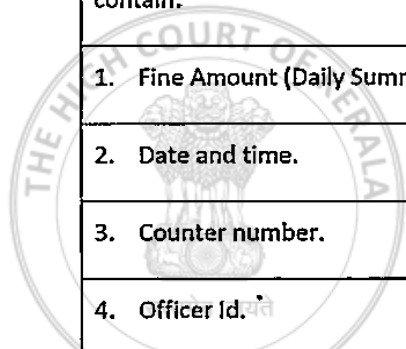


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		Payment, Collecting Officer Id, RT Office Id, Counter No, etc.
		The software should have a facility send reminders (with increased fine) if the payment is not received by the due date
		If the payments are not received after response time mentioned in the final reminder, the offense cases should be forwarded to the court for legal procedures by the authorized person
		On closing the counter, at the end of the day a consolidated list should be generated. The list should contain:
		1. Fine Amount (Daily Summary)
		2. Date and time.
		3. Counter number.
		4. Officer Id.
		5. RT Office Id
		It should be possible for the consolidated list to be verified by a higher officer or the authorized person— from his/her terminal
		The cash (Consolidated amount for a day) collected should be remitted in the bank / treasury and the corresponding "Chelan Id" provided by the treasury should be entered into the PSM by an authorized person thereby closing the account
Online Payment Mode		A user (offender) should be able to access the page of online payment by simply clicking link in a web Page of



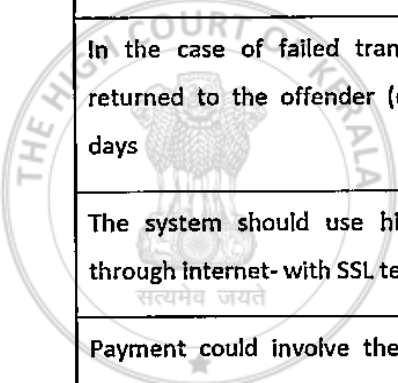
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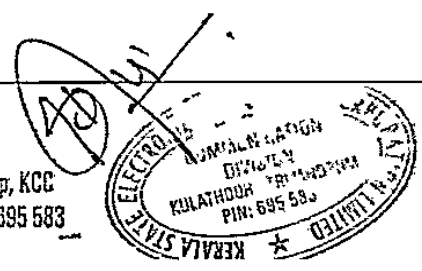


		<p>iii. Net banking</p> <p>The online payment should be done through a third party Payment Gateway (PG). The PG would necessary underground work to fulfil the online payment</p> <p>PG would return notifications –whether a transaction had been a success or failure. The DB of PMS should store this notification</p> <p>Online payment should be done as per the stipulated guidelines of RBI</p> <p>Money should reach the bank account of govt. department within T+ 3 days</p> <p>In the case of failed transactions money should be returned to the offender (customer) account within 4 days</p> <p>The system should use highly secured data transfer through internet- with SSL technology</p> <p>Payment could involve the participation of almost all nationalized and scheduled banks (more than 60 nos)</p> <p>It should be possible for the Administrator to generate reports of cash collection of Online payment between 2 given dates</p> <p>It should be possible for the Administrator to generate reports of refunded cases (failed) and settled cases (succeeded)</p>
5	Bank Reconciliation	At the end of each day the concerned officer in the bank generates a statement of transactions of the account in



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	which Online payment and Cash Counter payment are remitted
	He/she sends this statement as email attachment to a specified email id of the department
	PMS should periodically check this mail id and on finding the mail it should open it, read contents and store it in its Database
	PMS should make a comparison of records already available in the Database regarding each remittance and should notify discrepancy, if any

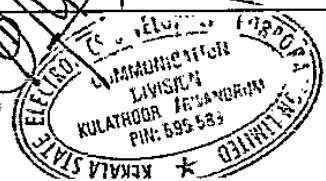
11. STATE CENTRAL CONTROL ROOM INFRASTRUCTURE

There will be a state Central Control Room (SCCR). 14 district enforcement offices will connect to central control room server and access offence data for further processing of the offence data, challan generation and despatch. The central Control room server also will receive hit from various RTO and other penalty payment receiving logins also the hit will come from online users who are making penalty payments.

11.1. PROPOSED BOM- SCCR

Sl. No.	Networking	Qty.
1	Core switch: 48/52 port 10 G BASE-T/ SFP+/ Converged Modular Switch Full Layer 3 functionality managed switch having minimum 4 QSFP	2
2	Next generation firewall- UTM	2
3	24/28 port GbE Web managed L2 access switch having 4 SFP ports/POE	2
3A	16Gb FC/10GbE 100m SFP+ Transceiver	As required
3B	10G SFP+ Single mode transceivers	As required

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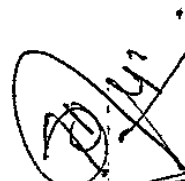



-4	SERVER	
	RACK SERVER as per specs attached: Intel family: Latest generation, 64 Bit processor, E5-2690 V4 and above with at least 8 cores and above, minimum 2.1 GHz or above , with 11MB Cache or above, Each with at least 64 GB DDR4 expandable up to 1.5 TB, 3 x 1.2TB SAS 12G Enterprise 10K SFF, storage controller, network adapter, redundant power supply as per specs	14
5	Storage The storage array should support industry-leading Operating System platforms including: Windows 2012, HPE-UX, Vmware and Linux. The Storage units: 48TB x 3 B usable Capacity with RAID 1+0 / RAID 6	3
6	TAPE DRIVE , BACKUP SERVER AND SOFTWARE	1 set
	Tape Drive Library	1 set
7	NAS 48.TB, Giga bit Ethernet & redundant power supply.	1
	DESKTOP COMPUTER	
8	Client PC: Desktop Computer, i5, Monitor, HDD, 8GB RAM	8
9	ANPR STATION: Desktop Computer I7, Monitor HDD, 16GB RAM, with GPU ANPR work station	10
10	Design and documentation, Installation of Server , Storage, Firewall, Router , Desktops, Core switch, Implementation, Data centre build , Civil and electrical work and related documentation, Training , hand-holding and Knowledge transfer, Warranty & Support for 5 years with necessary Manpower support	1
11	CONTROL ROOM BUILD UP & INTERIOR	
	Interior Design/ POP, false ceiling , flooring, entire modular furniture, Manager Cabins , officers cabins, Server room integration, Power wiring, UPS wiring, Generator wiring ,Industrial earthing, Networking for entire equipment's, Fire and Smoke detector, IP camera, NVR, Biometric access control and Attendance / Hr management system, Passive cabling ,Backbone connectivity with 10G solution, Rack to Rack connectivity with 10G solution ,MPO cassettes , comfort AC	1

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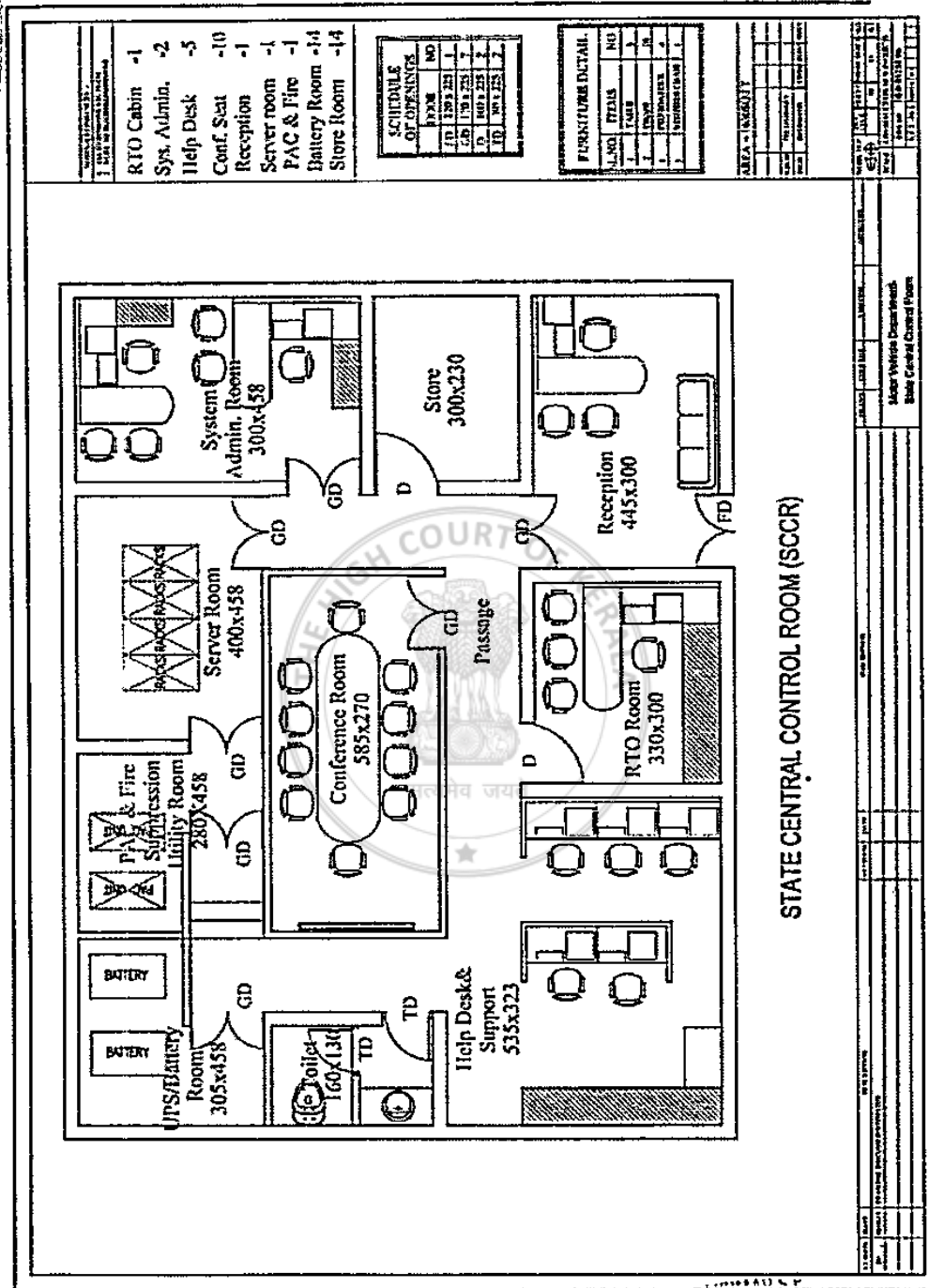
	with automatic change over system,100MBPS Dual leased line connectivity from different ISPs	
12	PRECISION COOLING SYSTEM AND RACK	
	COOLING SYSTEM	As per design
13	42/45 U RACK- APW/ RITTAL/VALRACK with high density cable manager, Power distribution Unit and other accessories	As required
	UPS	
14	60 KVA UPS with 30- 60 min back up with MCBs and Accessories –Parallel connection with Hot standby mode.	2
	GENERATOR SET	
15	150 kVA with auto ON and OFF with AMF panel and other Accessories	1
16	CONTROL ROOM SOFTWARE	
16a.	Violation download server software	As required
16b.	Payment management server software	As required
16c.	ANPR software	As required
16d	Charge memo preparation software(server & Client)	As required
16e	Database suite	As required
16f	HR Management Software	As required


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11.2. SCR LAYOUT



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11.3. TECHNICAL DETAILS OF MAIN HARDWARE COMPONENTS

(OR equivalent specification devices will be used)

MINIMUM TECHNICAL SPECIFICATIONS

	<p>RACK SERVER : 14 nos DELL/HP/CISCO</p> <p>(Plus additional requirements for connecting existing enforcement systems)</p>
	<p>Should support Hot Pluggable & Redundant Management</p> <p>Modules with onboard KVM functionality.</p> <p>Should provide detailed technical information.</p> <p>Vendor should be registered in Gartner Leader magic quadrant for Server</p> <p>Minimum 1RU rack mounted form factor</p>
Power	Should offer a Dual phase power subsystem
Processor	<p>For each Server:</p> <p>a) 2 Socket processor required</p> <p>b) Intel family: Latest generation, 64 Bit processor, E5-2690 V4 and above with at least 8 cores and above, minimum 2.1 GHz or above, with 11MB Cache or above</p>
Memory	Each with at least 32 GB DDR4 expandable up to 1.5 TB
Hard disk drive	<p>2 x 1.2TB SAS 12G Enterprise 10K SFF</p> <p>SAS internal Hot swappable HDD in each server, compatible with OS mentioned under specs, expansion options and matching configuration with infrastructure.</p> <p>Minimum 2 I/O slots, with 2 port 8/16 Gb/s Fiber or equivalent channel with RAID 5 installation.</p>
Storage Controller	Integrated PCIe 3.0 based SAS Raid Controller with RAID 5 Support
Networking Interface	Minimum 2x10G interface with SR 10G transceivers and 2x1/10G interface with 1G transceivers
Interfaces	Minimum of 4 * internal USB 3.0 port
Bus Slots	Minimum of 3Nos of PCIe 3.0 based mezzanine slots. One PCIe x16 based and one PCIe x8 based supporting Ethernet, FC adapters, Infini Band and SAS based adaptors



Graphics Memory capacity	Upto 16 MB
Supply of OS and support	Support of following OS: Win Server 2016 R2 (64 bit) Red Hat Enterprise Linux 6.x (64 bit), Suse Enterprise Linux v11, Oracle Linux
Virtualization software and Support	The virtualization software shall be licensed for the entire server.
Warranty	5 years
Provisioning	Essential tools, drivers, agents to setup, deploy and maintain the server should be embedded inside the server. There should be a built -in Update manager that can update firmware of system by connecting online.
Remote Management	System remote management should support browser based graphical remote console along with virtual power button, remote boot using USB/ CD/ DVD Drive. It should be capable of offering upgrade of software and patches from a remote client using media/ image/ folder. It should support server power capping and historical reporting and should have support for multifactor authentication. Server should support automated firmware update. Server should support agent less management using the out-of-band remote management port.
	The server should support Active monitoring of System Health and record changes in the server hardware and system configuration. It assists in diagnosing problems and delivering rapid resolution when system failures occur. Should support remote console sharing up to 2 or more users simultaneously during pre-OS and OS runtime operation. Full Remote management should be available over the browser. It should support encrypted Microsoft Terminal Services Integration.
Server management	Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should support automatic event handling that allows configuring policies to notify failures via e-mail, or SMS gateway or automatic execution of scripts.
	Should support scheduled execution of OS commands, batch files, scripts, and command line apps on remote nodes
	Should be able to perform comprehensive system data collection and enable users to quickly produce detailed reports for managed devices. Should support the reports to be saved in HTML, CSV or XML format.

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	Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/ firmware components. The Server Management Software should be of the same brand as of the server supplier.
Administrator Dashboard	Software should support certain kind of dashboard view to quickly scan the managed resources to assess the overall health of the server. The Dashboard should preferably display a health summary of the following:
	Server Profiles
	Server Hardware
	Enclosures
	Logical Interconnects
	Appliance alerts
	The status of each resource should be indicated.
Firmware management	Software should support firmware management for the managed devices centrally by offering baseline firmware version to keep the systems on supported version of firmware.
	Software should maintain firmware repository to download firmware from website and update on managed nodes when required.

STORAGE- DELL/HP/CISCO/JUNIPER	Functionality QTY -- 48TB - 3 nos
OPERATING SYSTEM & CLUSTERING SUPPORT	<ul style="list-style-type: none"> - The storage array should support industry-leading Operating System platforms including: <i>Windows 2012, HPE-UX, VMware and Linux.</i> - Offered Storage Shall support all above operating systems in Clustering.
CAPACITY & SCALABILITY	<ul style="list-style-type: none"> - The Storage Array shall be offered with 48TB x3 with RAID 1+0/ RAID 6 - For narmoure power saving, Storage narmoure shall be supplied with 2.5" Small form factor SFF drives however storage subsystem shall also support LFF drives with the addition of required disk enclosures. - Storage shall be scalable to minimum of 180 number of drives or greater than 160TB using 900GB SFF SAS drives.

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FRONT-END PORTS	<ul style="list-style-type: none"> - Offered Storage system shall be supplied with minimum of Dual 16Gbps FC ports and Dual 10Gbps ISCSI ports per controller. - Offered storage shall have flexibility to use all above ports either as FC or ISCSI by replacing the requisite SFP. Vendors shall provide the additional SFP accordingly. In case, vendor doesn't support this feature, then every controller shall be populated upfront with 4 x 16Gbps FC ports and 4 x 10Gbps ISCSI ports.
BACK-END	<ul style="list-style-type: none"> - Offered Storage subsystem back-end engine shall be running on latest SAS (6Gbps) loop speed.
ARCHITECTURE	<ul style="list-style-type: none"> - The storage array should support dual, redundant, hot-pluggable, active-active array controllers for high performance and reliability
NO SINGLE POINT OF FAILURE	<ul style="list-style-type: none"> - Offered Storage Array shall be configurable in a No Single Point of configuration including Array Controller card, Cache memory, FAN, Power supply etc.
DISK DRIVE SUPPORT	<ul style="list-style-type: none"> - For SFF drives, Offered Storage Array shall support minimum 300/600/900/1200 GB hot-pluggable Enterprise SFF SAS hard drives, 400/800/1600/3200GB SSD along with SAS MDL 1TB / 2TB drives. 2. For LFF drives, offered Storage Array shall support minimum of 4TB / 6TB / 8TB SAS MDL drives. 3. Offered storage array shall also have support for self-encrypted SAS and SAS MDL drives.
CACHE	<ul style="list-style-type: none"> - Offered Storage Array shall be given with Minimum of 4GB cache per controller in a single unit after removing the operating system overhead. - Cache shall be backed up in case of power failure for indefinite time either using batteries or capacitors or any other equivalent technology. - Offered Storage shall also have optional support for Flash cache using SSD / Flash drives. Offered storage shall support at-least 2TB Flash Cache. - Offered storage shall have at-least 2GB additional cache per controller for Metadata and System OS. Vendor shall clearly provide the document about the overall cache requirement for Metadata and System OS
RAID SUPPORT	<ul style="list-style-type: none"> - Offered Storage Subsystem shall support Raid 0, 1, 1+0 and Raid 6 with Dual Parity Protection
POINT IN TIME AND CLONE COPY	<ul style="list-style-type: none"> - Offered Storage array shall be configured with array based Snapshot and clone narmouredty and shall be configured for minimum of 64 snapshot licenses.

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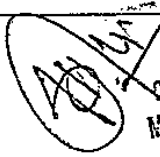
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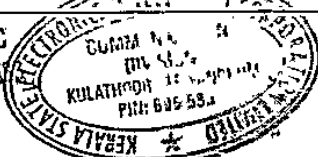





	<ul style="list-style-type: none"> - Offered Storage array shall support at-least 512 point in time copies (Snapshots).
REPLICATION	<ul style="list-style-type: none"> - Offered storage subsystem shall support storage based replication to DR location.
VIRTUALIZATION AND THIN PROVISIONING	<ul style="list-style-type: none"> - Offered storage shall be offered and configured with virtualization capability so that a given volume can be striped across all spindles of given drive type. - Offered Storage shall be offered and configured with Thin Provisioning capability.
DATA TIERING	<ul style="list-style-type: none"> - Offered Storage shall also have optional support for Sub-Lun Data tiring in real time fashion across different type of drives within a given pool like SSD, SAS, NL-SAS etc.
GLOBAL AND DEDICATED HOT SPARE	<ul style="list-style-type: none"> - Offered Storage Array shall support Global hot Spare for offered Disk drives. - At least 2 Global hot spare drive shall be configured for every 30 drives. - Storage subsystem shall also have the flexibility to assign dedicated spare for raid sets.
LOGICAL VOLUME & PERFORMANCE	<ul style="list-style-type: none"> - Storage Subsystem shall support minimum of 512 Logical Units. Storage Array shall also support creation of more than 100TB volume at controller level. - Offered Storage shall have inbuilt performance management software. Configuration Dashboard shall show overall IOPS and MB/sec performance
LOAD BALANCING & MUTI-PATH	<ul style="list-style-type: none"> - Multi-path and load balancing software shall be provided, if vendor does not support MPIO narmouredty of Operating system.
Warranty	<ul style="list-style-type: none"> - 5year Warranty with 24X7,NBD replacement support

TAPE DRIVE & BACKUP SOFTWARE- DELL/HP	Description of Requirement - QTY – 1 nos
DRIVE TECHNOLOGY SUPPORTED	<ul style="list-style-type: none"> - LTO-8 - LTO-7
MAXIMUM NUMBER OF DRIVES	<ul style="list-style-type: none"> - 2
MAXIMUM CAPACITY	<ul style="list-style-type: none"> - 720TB (LTO-8, 24 slots)
MAXIMUM DATA TRANSFER	<ul style="list-style-type: none"> - 2.16 TB/hr (2 LTO-8 drives)
DRIVE INTERFACE	<ul style="list-style-type: none"> - 8 Gb Native Fibre Channel 6 Gb/sec SAS

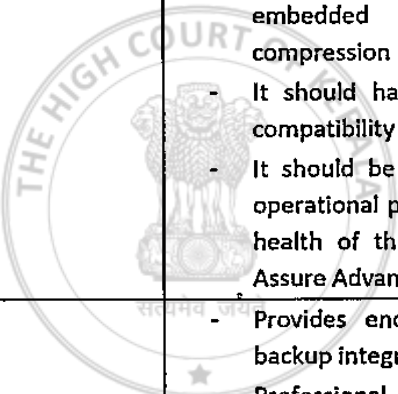


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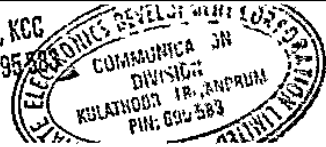


<p>FEATURES</p>	<ul style="list-style-type: none"> - It should have Exceptional storage density: 720 TB, 1.44 PB with (2.5:1 compression) using LTO-8 tape cartridges. - - Should be Easy-to-use web-based remote management - It should have Integrated bar code reader - It should have Tool-free tape drive upgrades - Ut should have Leverage tape drives - It should have Customer upgradeable redundant power supply - It should have Multiple interface choices available (FC or SAS) - It should have Removable magazines with user-configurable mail slots - It should be Easy-to-enable AES 256-bit embedded hardware encryption with compression - It should have Extensive OS and software compatibility testing - It should be Proactively monitor utilization, operational performance, and overall life and health of the drives and media with Tape Assure Advanced.
<p>SUPPORT AND WARRANTY</p>	<ul style="list-style-type: none"> - Provides end-to-end management of your backup integration process. - Professional backup and recovery planning that aligns with customer's business needs and implementation that reduces project execution time and risk to the storage environment. -
<p>DATA RATE MATCHING</p>	<ul style="list-style-type: none"> - It should optimizes performance and maximizes overall efficiency, allowing the drive to respond immediately to any data speed changes from the host. - It should minimizes rewinding and repositioning of the tape, significantly reducing physical wear and increasing reliability. - It should minimizes the power requirements for the drive by reducing the number of repositions



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<p>RELIABILITY</p>	<ul style="list-style-type: none"> - With a rating of 2,000,000 robot load/unload cycles, the Tape Libraries should provide necessary high reliability for today's demanding environment. To improve reliability and longevity, Ultrium products feature Data Rate Matching (DRM). This allows the tape drive to dynamically and continuously adjust the speed of the drive, to match the speed of the host or network. This increases performance, reduces mechanical wear on the tape drive and extends tape life.
<p>BACKUP</p>	<ul style="list-style-type: none"> - It should be Fast and reliable backup and recovery - It should meet organization's data protection expectations by reducing the time it takes to back up and recover critical information, apps and servers - Advanced integration with Vmware and Hyper-V. - It should minimize backup windows, decrease network traffic and reduce disk space required for storing backup data. - It should also reduce the total cost of ownership (TCO) with comprehensive dedupe to cloud that can save storage and infrastructure cost. - It should easily integrated with Vmware, Microsoft and Linux platforms

DESKTOP- DELL/HP/ACER	Description of Requirement
PROCESSOR	- Core i5
RAM	- RAM - 8GB, DDR4, 2400MHz
HARD DRIVE	- Min. 320 GB 5400 RPM hard drive
OPERATING SYSTEM	- Windows 8/10
GRAPHICS CARD	- Any with Display Port/HDMI or DVI support

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 KERALA STATE

 KULATHOOR TRADING

 PIN: 695 383



MONITOR	23" widescreen LCD with Display Port/HDMI or DVI support
WARRANTY	- 5 year warranty

DESKTOP- DELL/HP/ACER	ANPR – PC,
PROCESSOR	- Core i5
RAM	- RAM – 8GB, DDR4, 2400MHz
HARD DRIVE	- Min. 320 GB 5400 RPM hard drive
OPERATING SYSTEM	- Windows 8/10
GRAPHICS CARD	- 1050 GTX or better
WARRANTY	- 5 year warranty

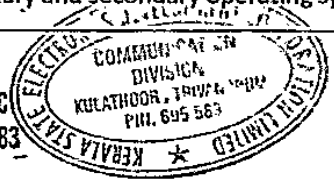
CORE SWITCH – CISCO/HP/DELL	DESCRIPTION OF REQUIREMENT - QTY – 2 NOS
I/O PORTS AND SLOTS	<ul style="list-style-type: none"> - The above Switch should be scalable to provide 40G SFP+ uplink. - should support combination of converged ports and SFP+/10GBASE-T. - Should have 1 RJ-45 out-of-band management port. - Shall have USB support to copy switch files to/from an USB flash drive
LAYER 3 ROUTING	<ul style="list-style-type: none"> - Should support both Ipv4 and Ipv6 IP addressing and protocol. - RIPv1 and RIPv2 routing - OSPF (Ipv4) and OSPFv3 (Ipv6) - Border Gateway Protocol (BGP) and Policy-based routing - Shall include Equal-cost Multipath (ECMP) capability - Multicast routing – PIM Sparse and PIM Dense modes - All Features should support day 1 itself
DUAL FLASH IMAGES	- Provides independent primary and secondary operating system

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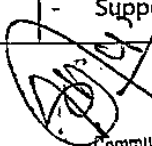
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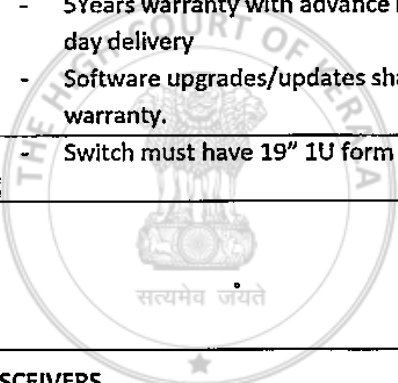
	<p>files for backup while upgrading</p> <ul style="list-style-type: none"> - Multiple configuration files to allow multiple configuration files to be stored to a flash image
RESILIENCY	<ul style="list-style-type: none"> - Hitless patch upgrade. - Ultrafast protocol convergence (<50 ms) with BFD or equivalent.
HIGH-PERFORMANCE SWITCHING	<ul style="list-style-type: none"> - Switch need to have non-blocking architecture.
REVERSIBLE AIRFLOW	<ul style="list-style-type: none"> - Enhanced for data center hot-cold aisle deployment with reversible airflow—for either, front-to-back or back-to-front airflow
STACKING	<ul style="list-style-type: none"> - Should support of stacking of switches
JUMBO FRAMES	<ul style="list-style-type: none"> - Support With frame sizes of up to 10,000 bytes
QUALITY OF SERVICE (QOS)	<ul style="list-style-type: none"> - Quality of service with advanced traffic management capabilities
PACKET FILTERING AND REMARKING	<ul style="list-style-type: none"> - Source-port filtering or equivalent feature to allow only specified ports to communicate with each other
TRAFFIC PRIORITIZATION	<ul style="list-style-type: none"> - Traffic prioritization based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, DiffServ etc
SECURITY	<ul style="list-style-type: none"> - IEEE 802.1x to provide port-based user authentication with multiple 802.1x authentication sessions per port - Media access control (MAC) authentication to provide simple authentication based on a user's MAC address - Web-based authentication to provide a browser-based environment to authenticate clients that do not support the IEEE 802.1X supplicant
DYNAMIC ARP PROTECTION	<ul style="list-style-type: none"> - Dynamic ARP protection blocking ARP broadcasts from unauthorized hosts
POWER SUPPLIES & FAN SLOT	<ul style="list-style-type: none"> - Should have redundant power supply and fan slots-populated on day 1
PROCESSOR	<ul style="list-style-type: none"> - Switch should have packet buffer size of 16 MB
MAC-BASED VLAN	<ul style="list-style-type: none"> - Should support Mac based VLAN
VLAN SUPPORT	<ul style="list-style-type: none"> - Provides support for 4,096 VLANs
PERFORMANCE	<ul style="list-style-type: none"> - Support 280K MAC addresses.


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	<ul style="list-style-type: none"> - Throughput of 1000 Mpps or better. - Routing and Switching capacity of 1400 Gbps or better. - Shall provide Gigabit (1000 Mb) Latency of < 4 μs and 10 Gbps Latency of < 3 μs.
ENVIRONMENT	<ul style="list-style-type: none"> - Operating temperature 32°F to 113°F (0°C to 45°C) - Operating relative humidity 10% to 90%, noncondensing
SAFETY & ELECTRICAL CHARACTERISTICS	<ul style="list-style-type: none"> - Shall support IEEE 802.3az Energy-efficient Ethernet (EEE) to reduce power consumption - Safety and Emission standards including EN 60950; IEC 60950; VCCI Class A; FCC part 15 Class Should support OpenFlow for investment protection and SDN environments.
RADIUS/TACACS+	<ul style="list-style-type: none"> - RADIUS/TACACS+ for switch security access administration.
WARRANTY & SOFTWARE UPGRADE	<ul style="list-style-type: none"> - 5Years warranty with advance replacement and next-business-day delivery - Software upgrades/updates shall be included as part of the warranty.
RACK SIZE	<ul style="list-style-type: none"> - Switch must have 19" 1U form factor.



10G SFP+ SINGLE MODE TRANSCEIVERS	
TRANSMIT POWER	-8.2 to +0.5
RECEIVE POWER	-14.4 to +0.5
CENTRAL WAVELENGTH (NM)	1310
FIBER MODE	SMF
TRANSMISSION DISTANCE	10 km (6.21 miles)

16Gb FC/10GbE 100m SFP+ Transceiver.	
TRANSMITTER POWER (DBM) ³	Maximum -14 Minimum -7.8
RECEIVER POWER (DBM) ³	Maximum -1 Minimum -11

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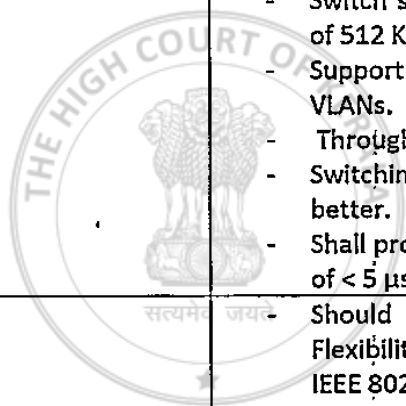
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WAVELENGTH	840 to 860 nm
FIBER MODE	MMF
COMMERCIAL TEMPERATURE RANGE	0 to 70°C (32 to 158°F)
STORAGE TEMPERATURE RANGE	-40 to 85°C (-40 to 185°F)

ITEM – 24/28 PORT GBE WEB MANAGED L2 ACCESS SWITCH WITH 4 SFP PORTS- CISCO/DELL/HP	QTY – 2NOS
MANAGEABILITY	- Switch must have front end console cable.
RACK SIZE	- Switch must have 1U form factor.
PERFORMANCE	- Switch should have packet buffer size of 512 KB. - Support 32K MAC addresses and 4094 VLANs. - Throughput of 40 Mpps or better. - Switching capacity of 55 Gbps or better. - Shall provide Gigabit (100 Mb) Latency of < 5 µs and 1Gbps
AUTHENTICATION	- Should support Authentication Flexibility Like: IEEE 802.1X Web based authentication Mac based authentication
LAYER 3 SERVICES	- Should support Dynamic ARP protection, DHCP protection and Secure FTP.
LAYER 3 ROUTING	- Should support Policy based routing support.
ENVIRONMENT	- Operating temperature 32°F to 104°F (0°C to 40°C) - Operating relative humidity 10% to 90%, noncondensing
WARRANTY	- Lifetime warranty.



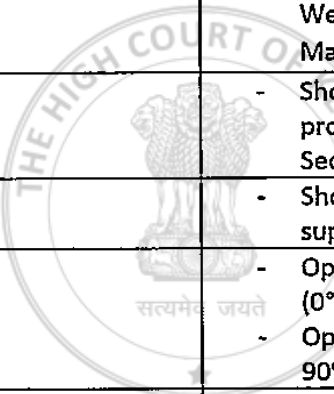
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 Communication Projects Group,
 Monvila, Thiruvananthapuram-695 022





24/28 PORT GBE ,L2 POE+ ACCESS SWITCH HAVING 4 SFP PORTS- CISCO/DELL/HP	QTY – 2NOS
MANAGEABILITY	- Switch must have front end console cable.
RACK SIZE	- Switch must have 1U form factor.
PERFORMANCE	- Switch should have packet buffer size of 512 KB. - Support 32K MAC addresses and 4094 VLANs. - Throughput of 40 Mpps or better. - Switching capacity of 55 Gbps or better. - Shall provide Gigabit (100 Mb) Latency of < 5 μs and 1Gbps Latency of < 5 μs
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LAYER 3 ROUTING	- Should support Policy based routing support.
ENVIRONMENT	- Operating temperature 32°F to 104°F (0°C to 40°C) - Operating relative humidity 10% to 90%, noncondensing
WARRANTY	- Lifetime warranty.

NEXT GENERATION UTM- FIREWALL- FORTINET/CHECKPOINT	2 NOS
INTERFACES, POWER SUPPLY AND STORAGE	- The appliance shall be supplied with at least 8 nos 10/100/1000 Gigabit ports. - Firewall should have local in-built storage of minimum 200GB SSD. - Firewall should have minimum 8GB memory.
GENERAL FEATURE	- 9 Gbps of firewall throughput



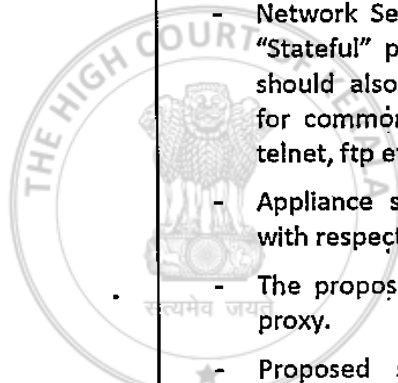
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	<ul style="list-style-type: none"> - 690 Mbps of NGFW1 - 395 Mbps of Threat Prevention - 150,000 connections per second, 64 byte response. - Solution should be an integrated Next Gen Firewall platform which includes firewall, application control, IPS, Anti-Spyware, URL Filtering and Advanced Persistent threat Prevention capabilities in a single appliance, configured in High Availability Mode. - Firewall must have minimum 500 Mbps of real world multiprotocol throughput including firewall, IPS, application visibility, Anti-Bot, Anti-Spyware, URL Filtering and Advanced Persistent threat Prevention features running at the same time. - Network Security Firewall should support "Stateful" policy inspection technology. It should also have application intelligence for commonly used TCP/IP protocols like telnet, ftp etc. - Appliance should have granular visibility with respect to user and group policy. - The proposed solution shall support DNS proxy. - Proposed solution support Multi Link Management and should support minimum two ISPs. - Should provide clear indications that highlight regulations with serious indications of potential breaches with respect to Access Policies, Intrusion, Malwares, BOT, URL, Applications etc. - Required software license for providing above features shall be included in the solution. - It should be able to scan SSL & TLS traffic.
VPN	<ul style="list-style-type: none"> - 2.16 Gbps of AES-128 VPN throughput - Firewall should support 3DES/AES IPSEC VPN throughput of at least 300 Mbps.



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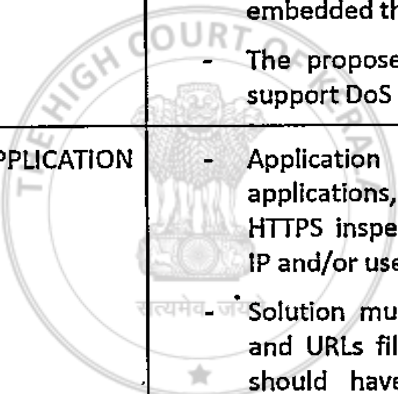
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	<ul style="list-style-type: none"> - It should support the Firewall and IPSEC VPN as integrated security functions.
<p>ADMINISTRATION, AUTHENTICATION & GENERAL CONFIGURATION</p>	<ul style="list-style-type: none"> - The Firewall should support authentication protocols like Active Directory, LDAP and have support for Firewall passwords token-based products and X.509 digital certificates - and integrate with Windows 2012 Active Directory for user authentication.
<p>IPS</p>	<ul style="list-style-type: none"> - 1.08 Gbps IPS - The IPS should IPS Engine should support Vulnerability and Exploit signatures, Protocol validation, Anomaly detection, Behaviour-based detection, Multi-element correlation. - IPS should be able to detect and prevent embedded threats with in SSL traffic. - The proposed solution must be able to support DoS protection.
<p>WEB CONTENT AND APPLICATION FILTERING</p>	<ul style="list-style-type: none"> - Application control must identify applications, its different categories, URLs, HTTPS inspection, Malware content sites, IP and/or user-based policies. - Solution must have a URL categorization and URLs filtering database. The solution should have the capabilities to block, permit, allow & log, protocols other than HTTP, HTTPS, FTP, SFTP. - Should scan outbound URL requests and ensure users do not visit websites that are known to distribute malware.
<p>SECURITY FEATURE</p>	<ul style="list-style-type: none"> - The solution should also have the scalability to scan & secure SSL encrypted traffic passing through gateway. Should perform inspection to detect & block malicious content downloaded through SSL. - Granularly define exceptions for SSL inspection to protect user privacy and comply with corporate policy. - Solution should have capability to integrate

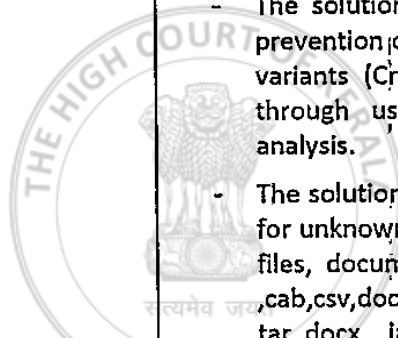


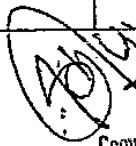
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	<p>with APT system to detect & Prevent bot outbreaks and APT attacks.</p> <ul style="list-style-type: none"> - Solution should be able to detect & Prevent the Bot infected machine. - Solution should be able to detect & Prevent Unique communication patterns used by BOTs i.e. Information about Botnet family. - Solution should be able to detect & Prevent attack types i.e., such as spam sending click fraud or self-distribution, that are associated with Bots - The solution should eliminate threats and remove exploitable content, including active content and embedded objects. - The solution should provide the protection from zero-day attacks, known & un-known attacks. - The solution should support detection & prevention of Cryptors & ransom ware and variants (Crypt locker , Crypto Wall etc) through use of static and/or dynamic analysis. - The solution should be able to scan & find for unknown threats in executable, archive files, documents, JAVA and flash like: 7z ,cab, csv, doc, pdf, ppt, pptx, rar, rtf, scr, swf, tar, docx, , jar, xls, , xlsx, zip etc.
<p>MANAGEMENT, LOGGING AND REPORTING</p>	<ul style="list-style-type: none"> - Upon malicious files detection, a detailed report should be generated for each one of the malicious files. - Firewall central management reporting, logging and narmour solution must be in dedicated appliance foot print. - Centralized Firewall management should be able to manage all functions specified in Firewall, NIPS, AntiBot specification from central console. - Firewall should be able to provide central logging, Analysis and granular reporting. - Management (Management, reporting, analysis) System Support for role-based administration of firewall. - Solution should support analysis of traffic pattern using graphs and charts

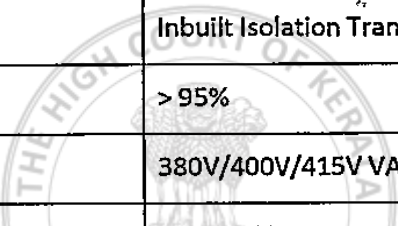



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UPS 60KVA- Hykon/APC/GE/VERTIV	QTY – 2 nos
CAPACITY	60kVA
QTY	2 nos
TYPE	True Online Double Conversion, pure sine wave, Microprocessor based DSP controlled, UPS System connected in Parallel Redundant Load Sharing Configuration with Echo mode, SNMP/ Mod Bus protocol supported.
PARALLELING	Each UPS unit should have inbuilt Parallel Kit. UPS should be capable of connected in Stand alone Configuration, Cold start future.
GALVANIC ISOLATION	Inbuilt Isolation Transformer
OVERALL EFFICIENCY	> 95%
INPUT VOLTAGE	380V/400V/415V VAC (3 phase+N+E)
INPUT VOLTAGE RANGE	208-478VAC
RECTIFIER & INVERTER	IGBT Rectifier & IGBT Inverter
INPUT CURRENT HARMONICS (THDI)	< 2% at full load (without use of any additional filters)
INPUT POWER FACTOR	0.99 or better
INPUT FREQUENCY	40 Hz to 70 Hz
OUTPUT VOLTAGE and Frequency.	400V, 3phase 50Hz. Settable for 380V / 400 V / 415 V AC (3Ph+N+PE), 50Hz+/-0.1Hz
OUTPUT VOLTAGE REGULATION	+/- 1% for 100% unbalanced loads
RATED POWER FACTOR	0.9 or better
RECOVERY TIME	<= 20ms (within one cycle) for 100% load change
WAVE FORM	Pure sine wave



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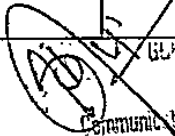

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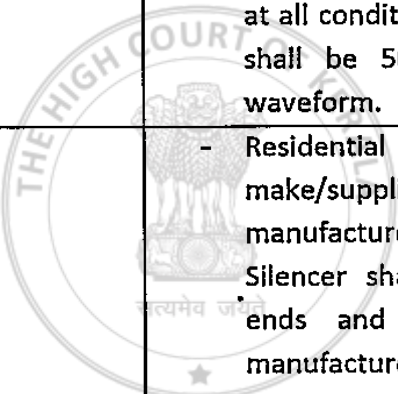
OUTPUT DISTORTION	< /= 2% for linear load, < 5% for non linear load
OVERLOAD CAPACITY	115% for 10 minutes, 130% for 1 minute
BYPASS	Automatic & Manual Bypass switch facility to be provided
SWITCHGEARS	Inbuilt Input, Output & Battery Isolators
COMMUNICATION SOFTWARE & CONNECTIVITY	SNMP Network monitoring
BATTERY TYPE	Sealed Maintenance Free for 30 Minutes for each UPS
BATTERY MAKE	Amarraja/Panasonic /Exide
BATTERY VAH REQUIRED	Minimum 54000 per UPS
STANDARDS	ISO 9001:2015, ISO 14001:2015, CE,ROHS, OHSAS OR Equivalent certification

GENERATOR-	Description of Requirement - QTY - 1 no
GENERATOR KVA RATING	- 150/160KVA with AMF control Panel comprising
ENGINE	- diesel engine, water cooled, Stamford or superior make Alternator and potential free contacts and digital out facility and should have all provision for future DG automation without adding any components in the DG set and complete with control Panel, fuel tank of suitable capacity and battery with leads and anti-vibration pads and residential type silencer. The DG set shall conform to detailed specifications attached with this schedule.


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 Communication Projects Group, KCO
 Menvila, Thiruvananthapuram-695 511




<p>OPERATING CONDITIONS</p>	<ul style="list-style-type: none"> - The engine alternator shall be capable of working at any ambient temperature between 0 Deg C to 50 Deg C with relative humidity upto 95% condition. - The working KVA rating at site condition after accounting for de-rating shall be obtained at 0.8power factor. - When there is an electrical main supply failure it will be required to work continuously for a period which may even exceed 24hour at a time. - The set shall be capable of taking 10% overload for a period of one hour during every 12hours.
<p>OUTPUT VOLTAGE FREQUENCY AND WAVE FORM</p>	<ul style="list-style-type: none"> - Nominal output voltage shall be 415Volt with + 1% manual adjustment at all conditions of the load. Frequency shall be 50Hz + 3% Hz in output waveform.
<p>SILENCER</p>	<ul style="list-style-type: none"> - Residential silencer with approved make/supplied by the engine manufacturer shall be provided. Silencer shall be supported on both ends and located as per engine manufacturer recommendations. Silencer shall be provided outside the canopy. The exhaust system of the generator must not be positioned to make any mark on the fence, containers or tower.
<p>SPEED AND GOVERNING</p>	<ul style="list-style-type: none"> - The engine shall operate on 1500 RPM, and be able to meet site conditions with regard to Voltage, Speed, Frequency and regulation equipped with governor of required accuracy.
<p></p>	<p></p>
<p>BATTERY CHARGING</p>	<ul style="list-style-type: none"> - The battery charging shall be done through alternator and solid state battery charger.



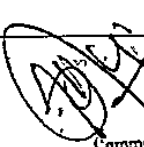
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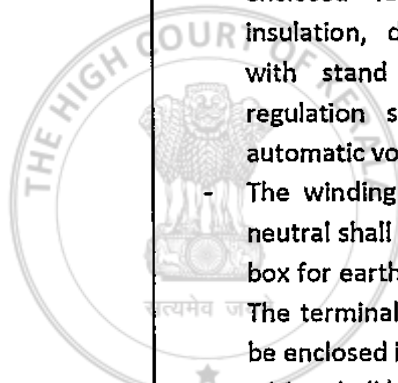
<p>ACCESSORIES:</p>	<ul style="list-style-type: none"> - Heavy duties fly wheel. - Coupling with guard. - Fuel Pump suitable for lifting the fuel from fuel tank provided below E/Asets. - Governor. - Pre filters, Fuel Filter - Pre-filter in lift pump/button filter. - Lubricating oil filter. - Residential exhaust silencer. - Electrical Starter motor - Blower fan. - Charging Alternator. - Digital electronic Governor Stainless steel exhaust flexible coupling - Radiator - Coolant inhibitor - Air Cleaner - All accessories included in the standard set like safeties, solenoid valve etc. shall be got from manufactures as a part of equipment.
<p>INTEGRATED CONTROL SYSTEM</p>	<ul style="list-style-type: none"> - Microprocessor based generator set monitoring , protection and electronic governing system .The monitoring system should be designed for the genset environment, provides genset protection, engine control and displays genset parameters (both engine & alternator), eliminating use of multiple conventional controls & metering.
<p>AC INSTRUMENTS</p>	<ul style="list-style-type: none"> - 3-phase AC Amps - 3-phase AC volts - KW - VA - Power factor - Frequency
<p>MEASUREMENTS/INSTRUMENTATION</p>	<ul style="list-style-type: none"> - Lube oil pressure - Coolant temperature - Engine speed - Hours run - Battery voltage


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ENGINE PROTECTION	<ul style="list-style-type: none"> - High coolant temperature (Audio-visual alarm & trip) - Low lube oil pressure (Audio-visual alarm & trip) - Fail to crank (trip) - Fail to start (trip) - Over speed (trip) - Low /High battery voltage (Audio-visual alarm) - Low coolant level shutdown(trip) - Engine shuts down due Charge alternator failure (Audio-visual alarm) - Engine shuts down due to lack of fuel (Audio-visual alarm)
ALTERNATOR	<ul style="list-style-type: none"> - The alternator shall be self excited, self regulated copper wound and totally enclosed for screen protected class-H insulation, designed and constructed to with stand tropical condition. Voltage regulation shall be + 1%. With digital automatic voltage regulator - The winding shall be star connected and neutral shall be brought out to the terminal box for earth with two independent earths. The terminal of the alternator output shall be enclosed in the terminal box. The AC/ DC wiring shall be separated from each other.



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11.4. CIVIL WORKS

The proposed data centre shall have non-permissible airtight, thermally insulated and fire rated Partition Walls. Both the real ceiling and real flooring to be leak proof, air tight and thermally insulated. For server room, rigid floor-to-ceiling partition walls having 2-hour fireproof rating are to be considered.

Opening in the walls/partitions at required place shall be provided for Electrical and LAN cabling entry to the server room and then sealed.

Partition with Fire , Moisture Resistant with thermal properties preferably block size of 600 x200 x 200 with cement mortar 1:4 plastering including racking joints curing scaffolding etc.

Partition walls of the Power room shall be built with burnt country bricks and should be plastered wall with super plaster / cement mortar 12mm thick inside and outside.

False ceiling:

The false ceiling shall be of Aerolite lightweight Calcium Silicate ceilings/Mineral fibreboard modular and grid type (600x600 tiles type), including covering the beams with fire rated board. All the ceiling tiles with grid shall be supported on suitable powder coated galvanized steel/hot dipped galvanized steel white shade suspension as per manufacturer specification. The ceiling shall be provisioned with cut-outs for lighting, Fire detectors, nozzles etc.

Horizontal level False Ceiling grid using hot dipped galvanized steel

Flooring:

The Server room and Power room should have Epoxy access flooring with antistatic properties.

Access floor systems shall conform to EN 12825 standard. The entire access floor system shall be made from Calcium sulphate, Cement and steel, solid fire resistant material to provide adequate fire properties, acoustic barrier and air leakage resistance. The system shall be able to with stand a UDL of 1631kg/Sq.m. point load of 305 kg .The pedestal shall withstand Axial load of 2200kg size. The Ratio of UDL concentrated load should be minimum 5 times.

For server room the under-structure system shall be rigid-grid with 24" (600 mm) Clearance between bottom of tile and top of treated real floor. Assembly shall provide a means of levelling and locking at a selected height. Assembly shall provide 30mm adjustment.

For non-full tiles (cut out tiles): treat / insulate edge with PVC

74



The access floor panel shall be laminated with finishes as required and same shall be factory laminated on semiautomatic lamination lines leaving no chance for human error. The finish shall be either High Pressure Laminate/ Antistatic Vinyl flooring of required shade protected on its edges with PVC beading with mitred corners which shall factory fit or integral trim design.

Fire Suppression System

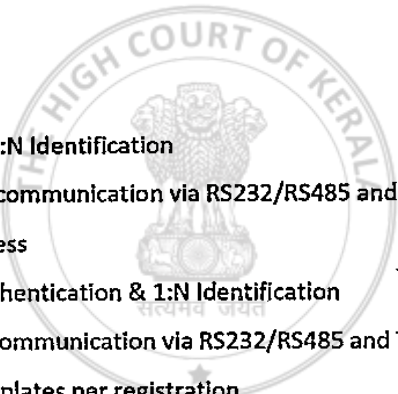
To minimize the risk of damage caused by Fire, an environment Friendly Clean Agent Based Automatic Fire Suppression System has been proposed for the Server Area, Workstation area, UPS Room, Battery Room.

VESDA (Very Early Smoke Detection System)

Early detection of smoke would be the key factor in preventing the fire from developing. The earlier a fire is detected and extinguished, the less damage will be caused. It is an aspirating smoke detection system that provides the earliest possible warning to incipient fires.

Door Access control System

- 300 fingerprints
- 30,000Event buffers
- 1:1 Authentication & 1:N Identification
- Stand-alone/Network communication via RS232/RS485 and TCP/IP
- FX50u Standalone Access
- control system 1:1 Authentication & 1:N Identification
- Standalone/Network communication via RS232/RS485 and TCP/IP
- Up to 3fingerprint templates per registration
- Up to 3 fingerprint templates per registration
- FAR (False Acceptance Rate) with less than 0.0001%
- FRR (False Rejection Rate) with less than 0.1%
- Language Support: English,
- Voltage:3A/12V DC
- Standard Current:50mA
- Operating Current: 400mA



GOPAKUMAR S P
Head CFS
Communication Projects Group,
Menara, Thiruvananthapuram

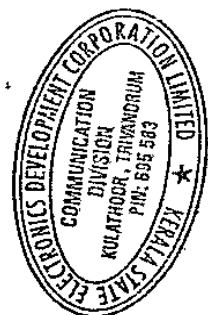




12. DISTRICT ENFORCEMENT CONTROL ROOM (DECR)

Sl. No.	Districts	MVR/AMVI (Laptop)	Staff (Desktop)	Power charge	FMS	RTO (Laptop)	Firewall	Heavy duty printer	6KVA Online UPS with 3 hr backup	48 port Gigabit switch	Networking/ Electricification	Control room build-up	Estimated Built-up Maximum Area (Sq. Ft.)
1	Trivandrum	32	11	Included	Included	1	1	1	1	1	1	1	600-1000
2	Kollam	28	11	Not Included	Included	1	1	1	1	1	1	1	600-1000
3	Palakkad	20	7	Not Included	Included	1	1	1	1	1	1	1	550-850
4	Alappuzha	24	7	Included	Included	1	1	1	1	1	1	1	550-850
5	Kottayam	24	8	Included	Included	1	1	1	1	1	1	1	550-850
6	Koottayam	24	7	Not Included	Included	1	1	1	1	1	1	1	550-850
7	Ernakulam	32	11	Not Included	Not Included	1	1	1	1	1	1	1	
8	Thrissur	28	11	Not Included	Included	1	1	1	1	1	1	1	600-1000
9	Palakkad	24	8	Not Included	Included	1	1	1	1	1	1	1	550-850
10	Malappuram	24	11	Not Included	Included	1	1	1	1	1	1	1	600-1000
11	Kozhikode	32	11	Not Included	Not Included	1	1	1	1	1	1	1	
12	Wayanad	12	6	Included	Included	1	1	1	1	1	1	1	500-800
13	Kannur	24	8	Not Included	Included	1	1	1	1	1	1	1	550-850
14	Kasaragod	12	7	Not Included	Included	1	1	1	1	1	1	1	550-850
	Total	340	124	4	12	14	14	14	14	14	12	12	

[Signature]
 GOPAKUMAR S P
 Head CPG
 Communication Projects Group, KCC
 Manjila, Thiruvananthapuram-695 583




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12.1. DECR- SUB SYSTEM SPECIFICATIONS

Firewall

IPS Throughput (Mbps)	325
Firewall, 1518 byte UDP packets (Mbps)	2000
VPN, AES-128 Throughput (Mbps)	275
IPsec VPN Tunnels	980
IPS (Mbps)	50
Antivirus (Mbps)	50
Connections per Second	20000
Concurrent Connections	500,000
Firewall Throughput (Mbps)	900
Threat Prevention (Mbps)	100
Security	Firewall, VPN, User Awareness, QoS, Application Control, URL Filtering, IPS, Anti-Bot, Antivirus, Anti-Spam and SandBlast Threat Emulation (sandboxing)
Unicast, Multicast Routing	OSPFv2, BGPv4 and 4+, RIP, PIM (SM, DM, SSM), IGMP
Mobile Access User License	100 in default package, 150 maximum
WAN	1x 10/100/1000Base-T RJ-45 port
DMZ	1x 10/100/1000Base-T RJ-45 port
LAN Switch	6x 10/100/1000Base-T RJ-45 ports


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 Head CTS
 Communication Services Group, KCC
 Monvila, Thiruvananthapuram 695 583





Wi-Fi (optional)	802.11 b/g/n/ac MIMO 3x3
Radio Band (association rate)	1 radio band: 2.4Ghz (max 450 Mbps) or 5Ghz (max 1300 Mbps)
Console Port	1x RJ-45, 1x Mini USB
USB Port	1x USB 3.0
3G/4G Modem Support	Yes
DSL (optional)	VDSL: G.993.1 (VDSL), G.993.2 (VDSL2), G.993.5 (VDSL2 Vectoring), G.998.4 (G.INP), VDSL2 profiles: 8a, 8b, 8c, 8d, 12a, 12b, and 17a ADSL: Annex A (POTS), Annex B (ISDN), G.992.1 (ADSL), G.992.3 (ADSL2), G.992.5 (ADSL2+), Annex M (ADSL2/2+), Annex L Reach-extended (ADSL2) Dying Gasp, DSL Forum TR-067, TR-100, TR-114 Conformity
Enclosure	Desktop
Operating / Storage	0°C ~ 40°C / -45°C ~ 60°C (5~95%, non-condensing)
AC Input	110 – 240V, 50 – 60 Hz
Power Supply Rating	12V/3.33A 40W desktop adaptor
Power Consumption (Max)	25W (non-Wi-Fi), 30W (Wi-Fi)
Safety/Emissions/Environment	UL/c-UL, IEC 60950 CB / EMC: EN55022 Class B, FCC: Part 15 Class B / RoHS, REACH, WEEE

Heavy Duty Printer

Print speed black	Normal: Up to 23 ppm
Duty cycle (monthly, A4)	Up to 50,000 pages per month
Print technology	Laser
Print quality	Optical: 600 x 600 dpi

GOPAKUMAR S P
Head CP
Communication Project Group
Muvattupuzha, Thruvananthapuram 686 503



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Display	4-Line LCD
Processor speed	600 MHz
Connectivity	High speed USB 2.0, Built-in Ethernet 10/100 Base TX networking
Memory	128 MB
Paper handling input	100-sheet multi-purpose tray 1, 250-sheet input tray 2, automatic two-sided printing
Paper handling output	Up to 250 Sheets
Maximum output capacity	Up to 250 Sheets
Duplex printing	Plain, Mid-weight, Light, LaserJet, Colored, Pre-printed, Recycled, Intermediate, Letterhead, Pre-punched, A4, A5, B5(JIS), Letter, Executive, Statement, A3, B4(JIS), B5(JIS), 8K, 16K, 11x17, Legal, Oficio 216x340, Oficio 8.5 x 13 16 x 29 lb, (60 x 110 g)
Power	AC 220 – 240V:50/60Hz, Normal Operation 550W, Ready 80W, Max/Peak 1.1kWh, Sleep/Power Off 1W/0.2W, TEC 0.998kwh
Power consumption	TEC: 0.998 kWh
Operating temperature range	10 to 30°C

6 KVA Online UPS

Power	6KVA
Input	Single phase & earth ground
Voltage range	184 – 288VAC @ 100% load
Frequency	40 – 70 Hz

GOPAKUMAR S P
Head CFC

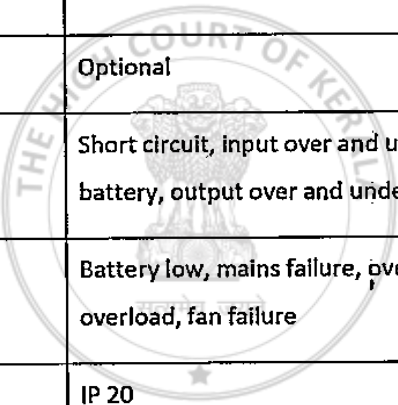
Communication Department KCC
Muvva, Thiruvananthapuram



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R6 (b) **KELTRON**

Output system	Single phase & earth ground,
Output voltage	208V/220V/230V/240V settable
Output waveform	Pure sine wave
Output frequency	50Hz +/- 0.02% (free running)
Voltage regulation	+/- 1%
Battery Charging current	1-5A adjustable
Charger type	Constant voltage constant current
Overall efficiency @ full load	94%
Inverter efficiency @ full load	93%
Manual bypass	Optional
Protection	Short circuit, input over and under voltage, overcharging of battery, output over and under voltage
Audible alarm	Battery low, mains failure, over temperature, inverter overload, fan failure
Enclosure grade of protection	IP 20
Operating temperature	0 – 40 deg



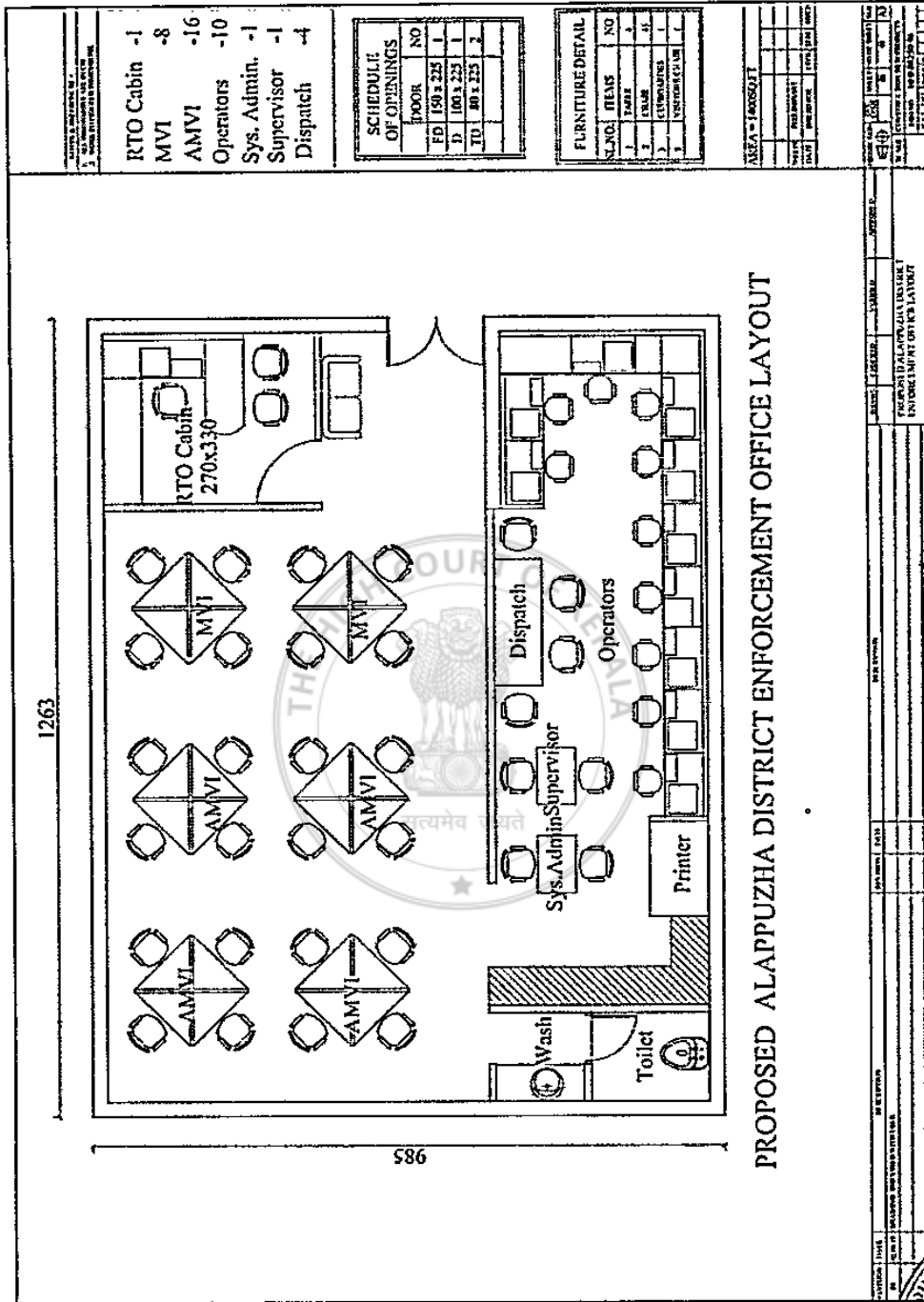
GOPAKUMAR S P
 Head CGP
 Communication Pr., Group, KCC
 Monvila, Thiruvananthapuram 695 583



80



12.2. DECR- LAYOUT



RTO Cabin	-1
MVI	-8
AMVI	-16
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS	
DOOR	NO
FD	150 x 225 1
TD	100 x 225 1
TD	40 x 225 2

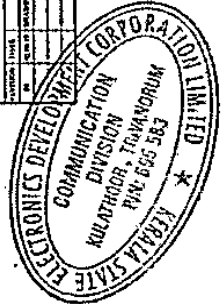
FURNITURE DETAIL		
SL.NO	ITEMS	NO
1	TABLE	3
2	CHAIR	31
3	COMPUTERS	1
4	SYSTEMS CUM	1

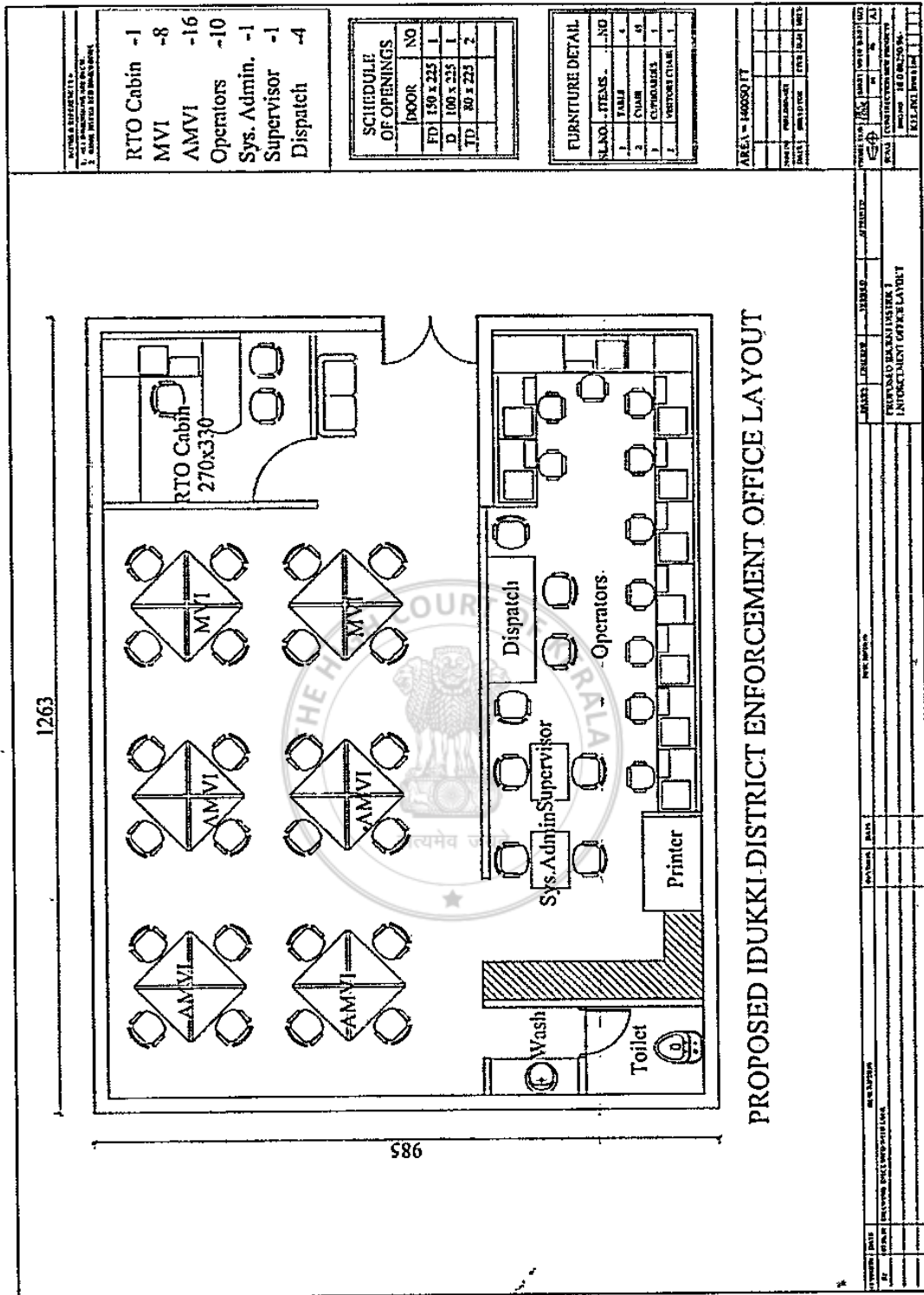
PROPOSED ALAPPUZHA DISTRICT ENFORCEMENT OFFICE LAYOUT

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GOKULKUMAR S P
 Head CPG
 Communication Projects Group, KCG
 Manilla, Thiruvananthapuram-595 593



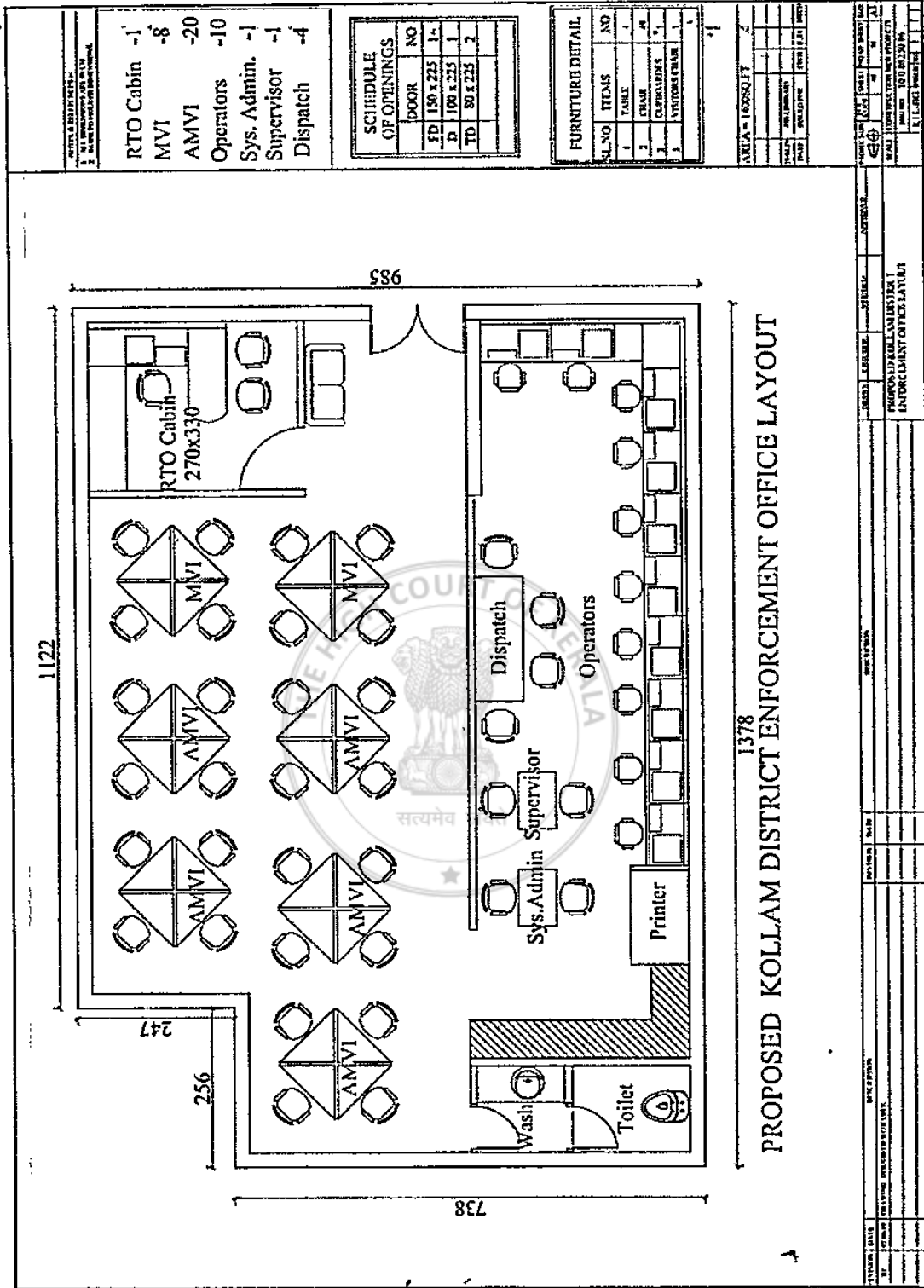


RTO Cabin -1		FDI 150 x 225 1		FURNITURE DETAIL		AREA = 14000 FT	
MVI -8		D 100 x 225 1		1 TABLE 4		NO. OF DESKS	
AMVI -16		TD 80 x 225 2		2 CHAIR 8		NO. OF SEAT	
Operators -10				1 CUPBOARDS 1		NO. OF CABINETS	
Sys. Admin. -1				1 WIRELESS CHAIR 1			
Supervisor -1							
Dispatch -4							

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 BOPAKUMAR SP
 11/12/2023



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LEGEND & QUANTITIES

RTO Cabin	-1
MVI	-8
AMVI	-20
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS

DOOR	NO
ED	150 x 225 1-
D	100 x 225 1
TD	80 x 225 2

FURNITURE DETAIL

SL.NO	ITEMS	NO
1	TABLE	1
2	CHAIR	20
3	CUPBOARD	1
4	SYSTEMS CHAIR	1

AREA = 1485 SQ FT

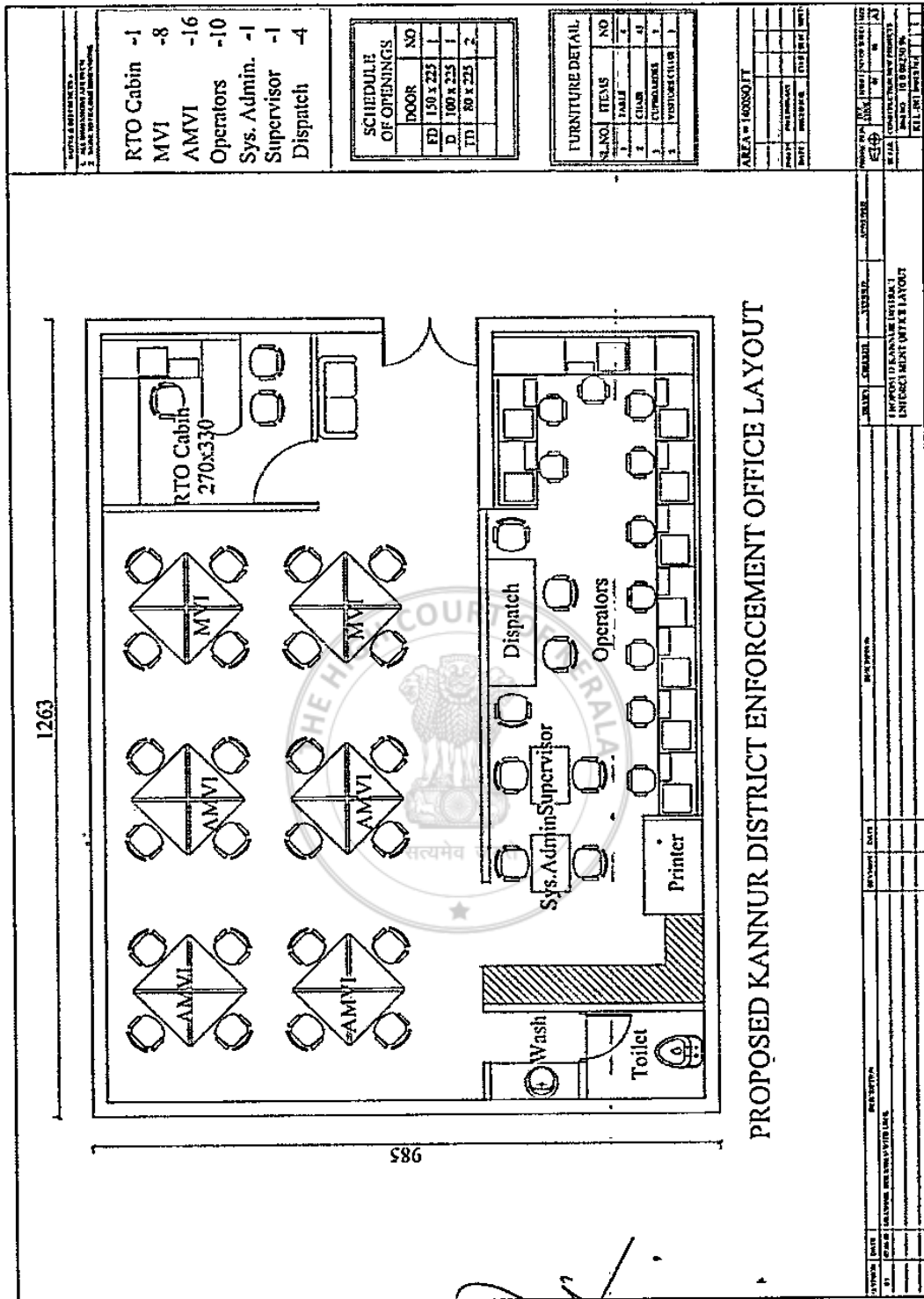
AREA	1485 SQ FT
------	------------

PROPOSED KOLLAM DISTRICT ENFORCEMENT OFFICE LAYOUT

DATE	10/01/2023
SCALE	1:100
PROJECT	PROPOSED KOLLAM DISTRICT ENFORCEMENT OFFICE LAYOUT

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 GOPAKUMAR SP
 Head, CPB
 Communication Projects Group, KCE
 Monvia, Thiruvananthapuram - 695 582





RTO Cabin	-1
MVI	-8
AMVI	-16
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS	
DOOR	NO
FD	130 x 225 1
D	100 x 225 1
TD	80 x 225 2

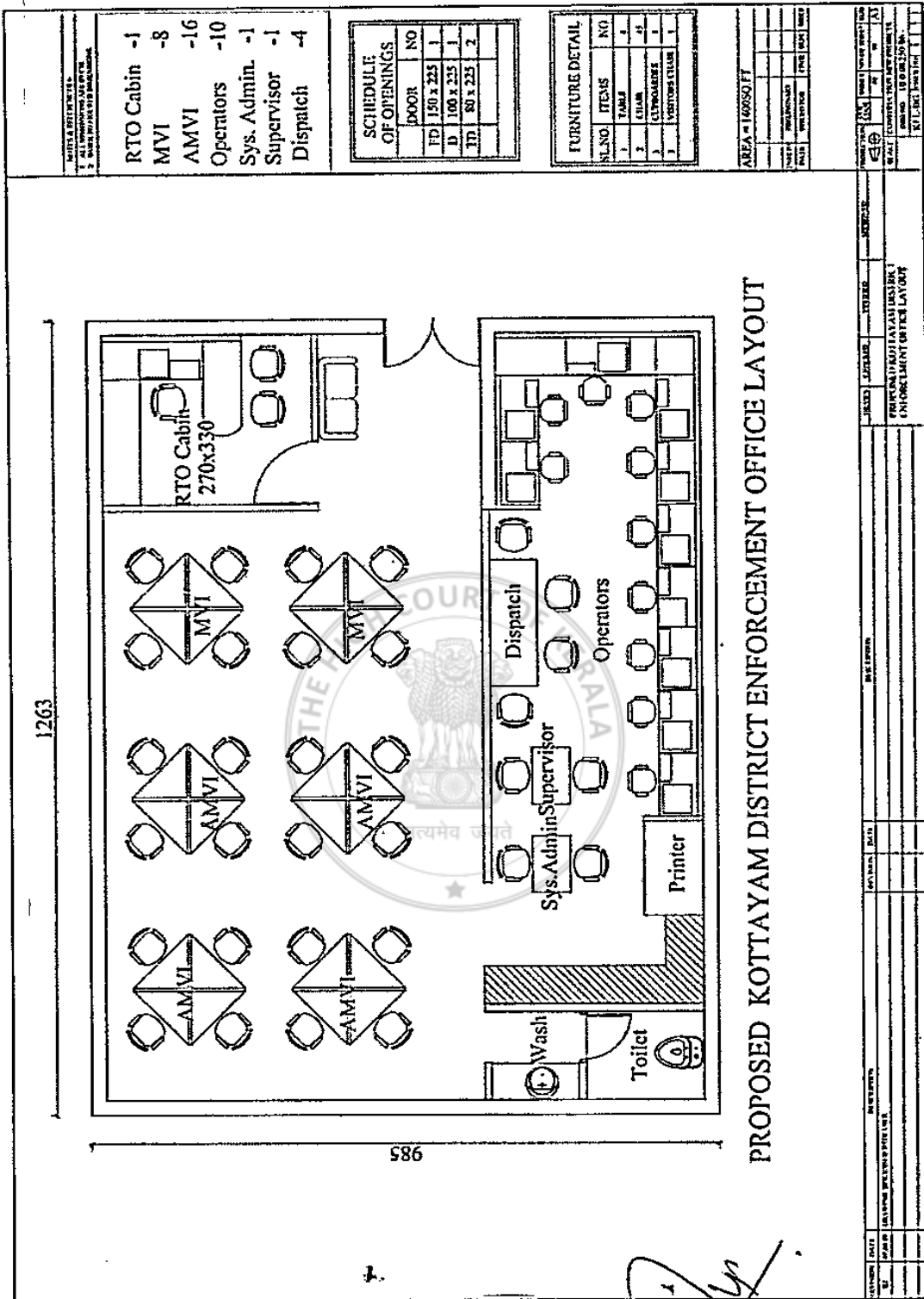
FURNITURE DETAIL		
SL.NO	ITEMS	NO
1	TABLE	2
2	CHAIR	4
3	STORAGE	1
4	VENTILATOR	1

AREA = 1600 SQ FT

NO	DATE	REMARKS
1		
2		
3		
4		
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GOPAKUMAR S P
Head CPG
Communication Projects Group, KCC
Monsifa, Thiruvananthapuram-695 577





STAFF REQUIREMENT

RTO Cabin	-1
MVI	-8
AMVI	-16
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS

DOOR	NO
TD	150 x 225 1
D	100 x 225 1
TD	80 x 225 2

FURNITURE DETAIL

SL.NO	ITEMS	NO
1	TABLE	8
2	CHAIR	45
3	ALUMINIUM	1
4	VISITORS CHAIR	1

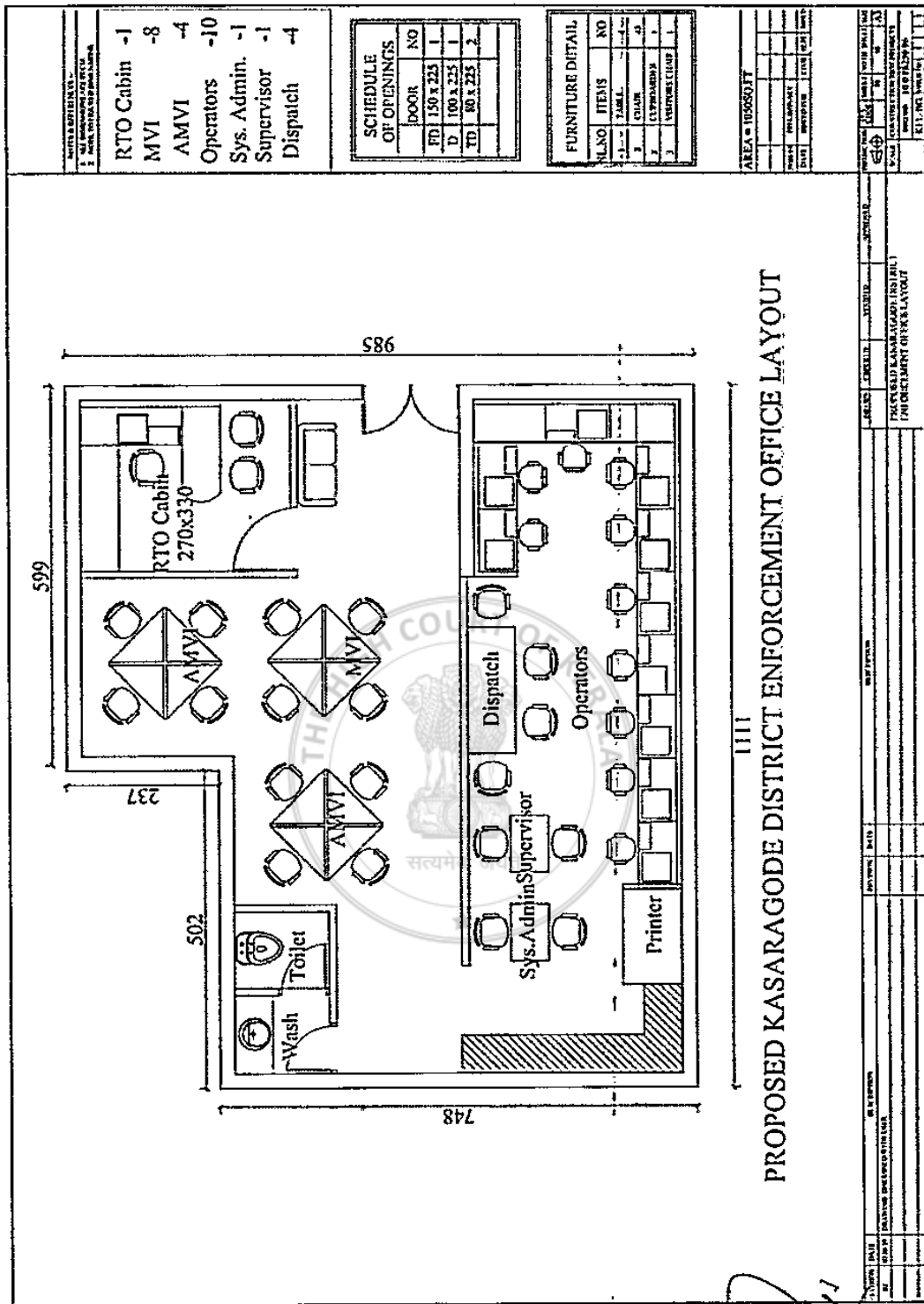
AREA = 140950 FT

NO. OF WORKSTATIONS	NO. OF OPERATORS	NO. OF VISITORS CHAIRS
8	10	1

PROPOSED KOTTAYAM DISTRICT ENFORCEMENT OFFICE LAYOUT



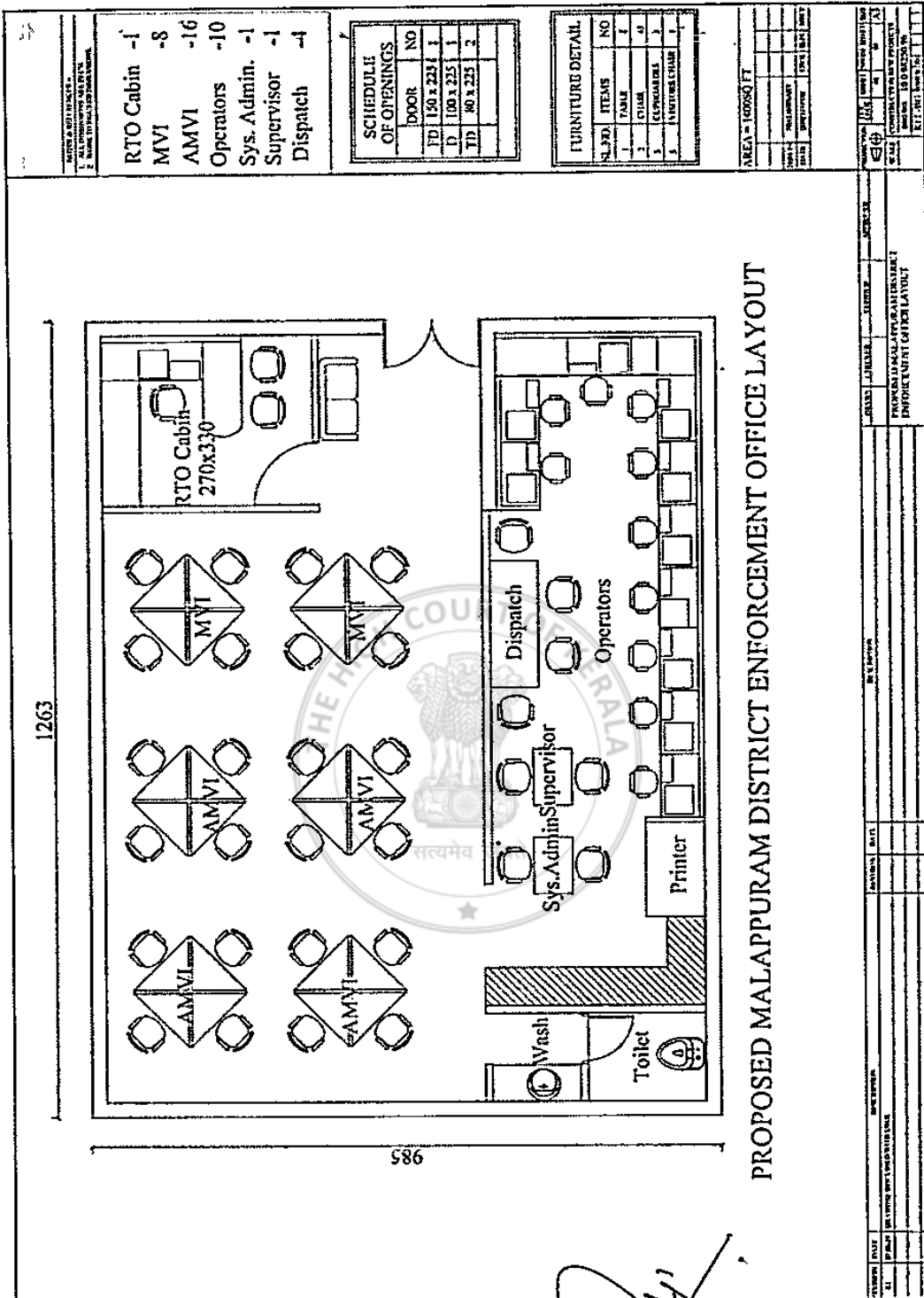
GOPAKUMAR SP
 Head CPG
 Communication Projects Group, KCC
 Monvila, Thiruvananthapuram-695 583



PROPOSED KASARAGODE DISTRICT ENFORCEMENT OFFICE LAYOUT



GOPAKUMAR S P
 Head CPE
 Communication & IT Dept, Kasaragode, KCC
 Mobile: 9746321000, 9746321000



SECTION 4 - RTO CABIN

1. ALL DIMENSIONS IN METERS
2. ROOM NO. 100 X 225

RTO Cabin	-1
MVI	-8
AMVI	-16
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS

DOOR	NO
TD	150 X 225 1
D	100 X 225 1
TD	90 X 225 2

FURNITURE DETAIL

S.L.NO	ITEMS	NO
1	TABLE	1
2	CHAIR	4
3	CEILING FAN	1
4	FURNITURE CHAIR	1

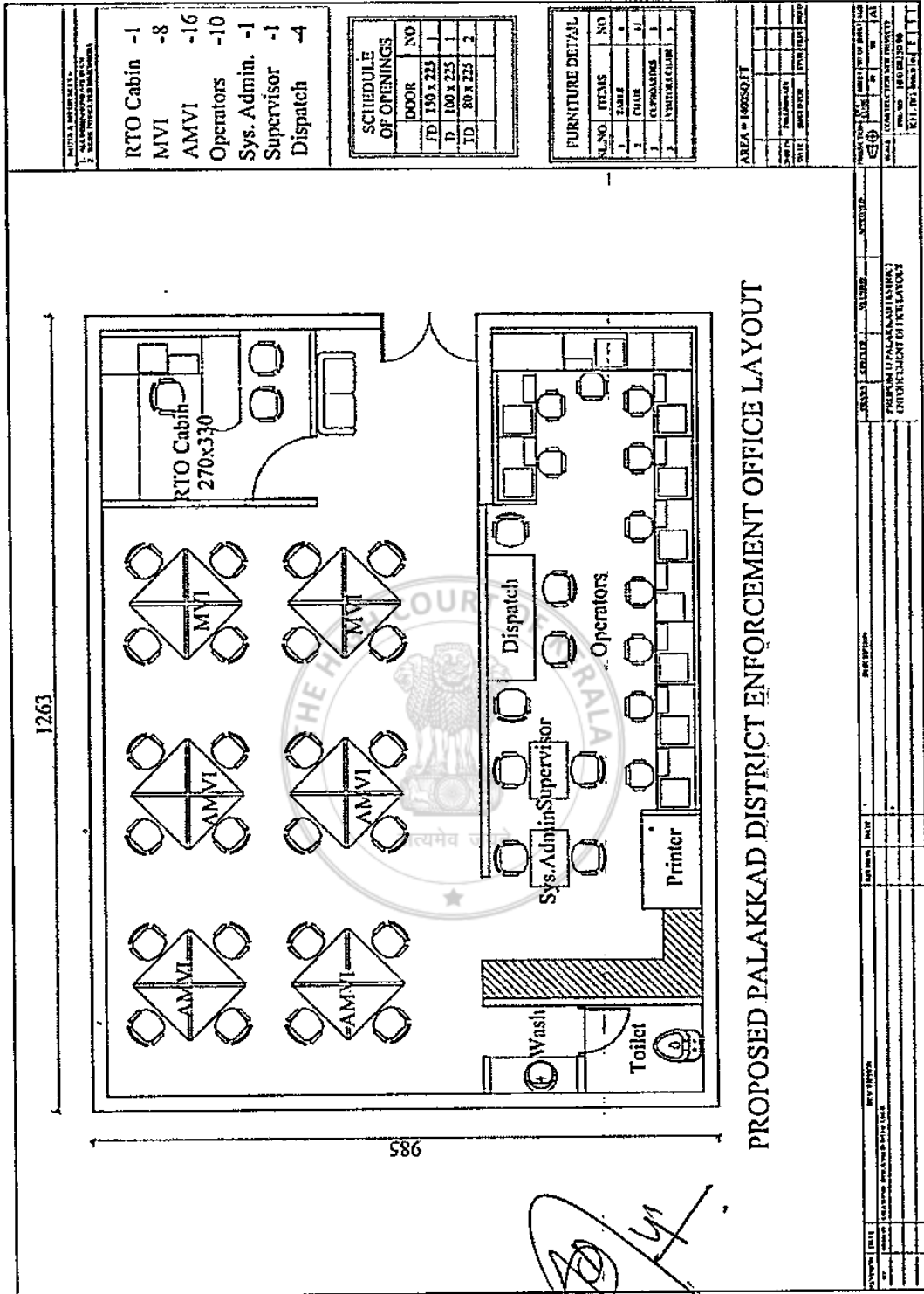
AREA - 1000SQ FT

AREA	1000 SQ FT
PERIMETER	
VOLUME	
NO. OF WINDOWS	
NO. OF DOORS	
NO. OF LIGHTS	
NO. OF FANS	

NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DATE																				
TIME																				
TEMPERATURE																				
WIND DIRECTION																				
WIND VELOCITY																				
REL. HUMIDITY																				
SOIL TYPE																				
WATER TABLE																				
FOUNDATION																				
ROOF TYPE																				
WALL TYPE																				
FLOOR TYPE																				
CEILING TYPE																				
PAINT TYPE																				
GLASS TYPE																				
DOOR TYPE																				
WINDOW TYPE																				
SCREEN TYPE																				
PROJECTOR TYPE																				
TELEPHONE TYPE																				
TV TYPE																				
REF. TYPE																				
STOVE TYPE																				
WATER TAP TYPE																				
TOILET TYPE																				
WASH TYPE																				
PRINTER TYPE																				
DISPATCH TYPE																				
OPERATORS TYPE																				
SYST. ADMIN. SUPERVISOR TYPE																				
AMVI TYPE																				
MVI TYPE																				
RTO CABIN TYPE																				

GOPAKUMAR SP
Head CPIS
Communication Projects Group- KCC
Minnole, Thiruvananthapuram-695 583





NOTES & SPECIFICATIONS -
 1. ALL WORKS TO BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE ARCHITECT.
 2. ALL MATERIALS TO BE USED SHALL BE OF THE BEST QUALITY AND SHALL BE APPROVED BY THE ARCHITECT.

RTO Cabin	-1
MVI	-8
AMVI	-16
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS	
DOOR	NO
TD 150 x 225	1
D 100 x 225	1
TD 80 x 225	2

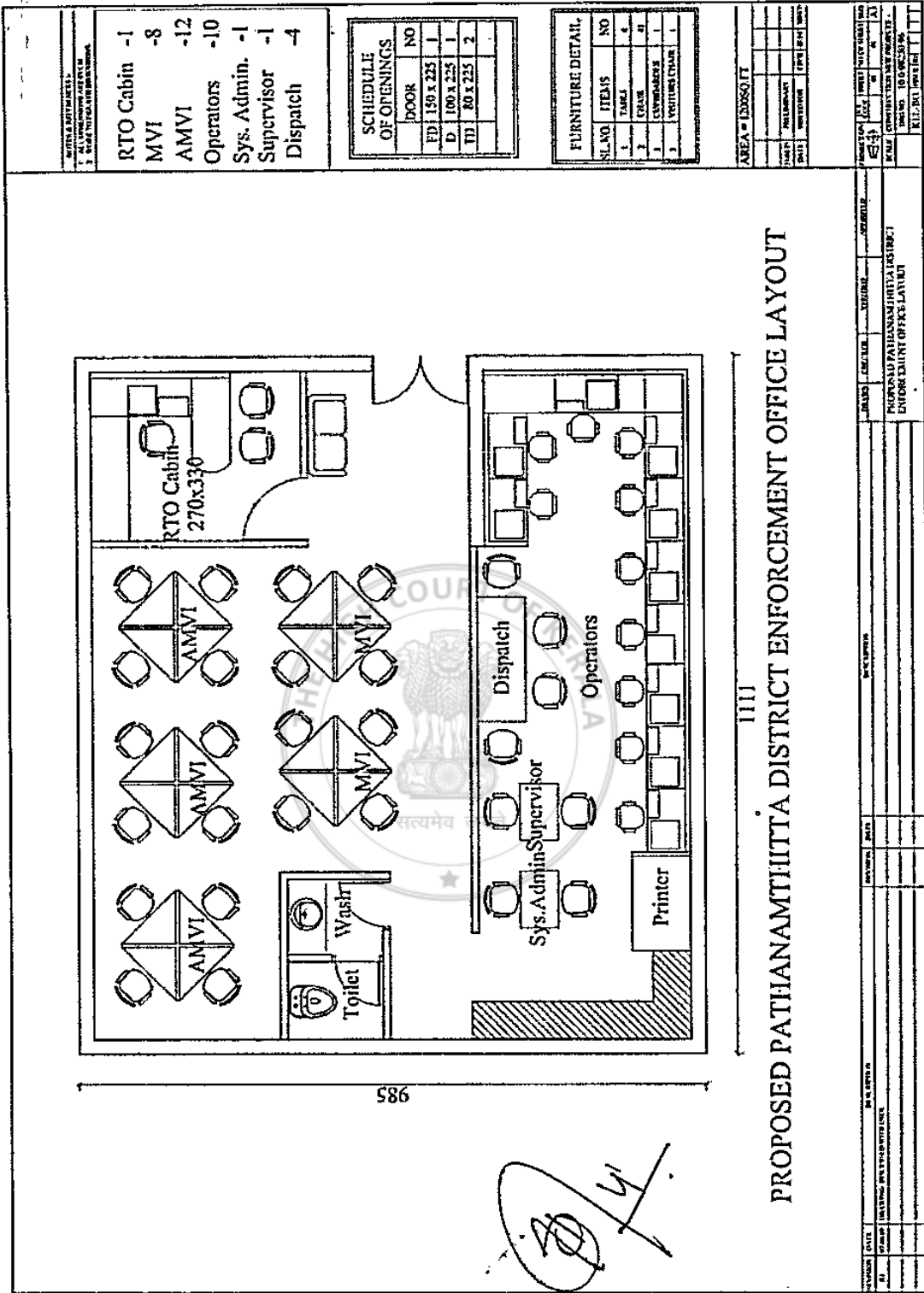
FURNITURE DETAIL		
SL.NO.	ITEMS	NO
1	TABLE	8
2	CHAIR	31
3	CEILING LIGHTS	1
4	VENTILATOR	1

AREA = 146550 FT

DATE	SCALE	PROJECT NO.
DESIGNED BY	DATE	NO.
CHECKED BY	DATE	NO.
APPROVED BY	DATE	NO.

GOPAKUMAR S P
 Head C/P
 Communication Projects Group, KCC
 Menzies, Thiruvananthapuram-695 533





RTO Cabin	-1
MVI	-8
AMVI	-12
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS	
DOOR	NO
ED	150 x 225 1
D	100 x 225 1
TD	80 x 225 2

FURNITURE DETAIL		
SLAND	ITEMS	NO
1	TABLE	4
2	CHAIR	41
3	SWIVEL CHAIR	1
4	OFFICE CHAIR	1

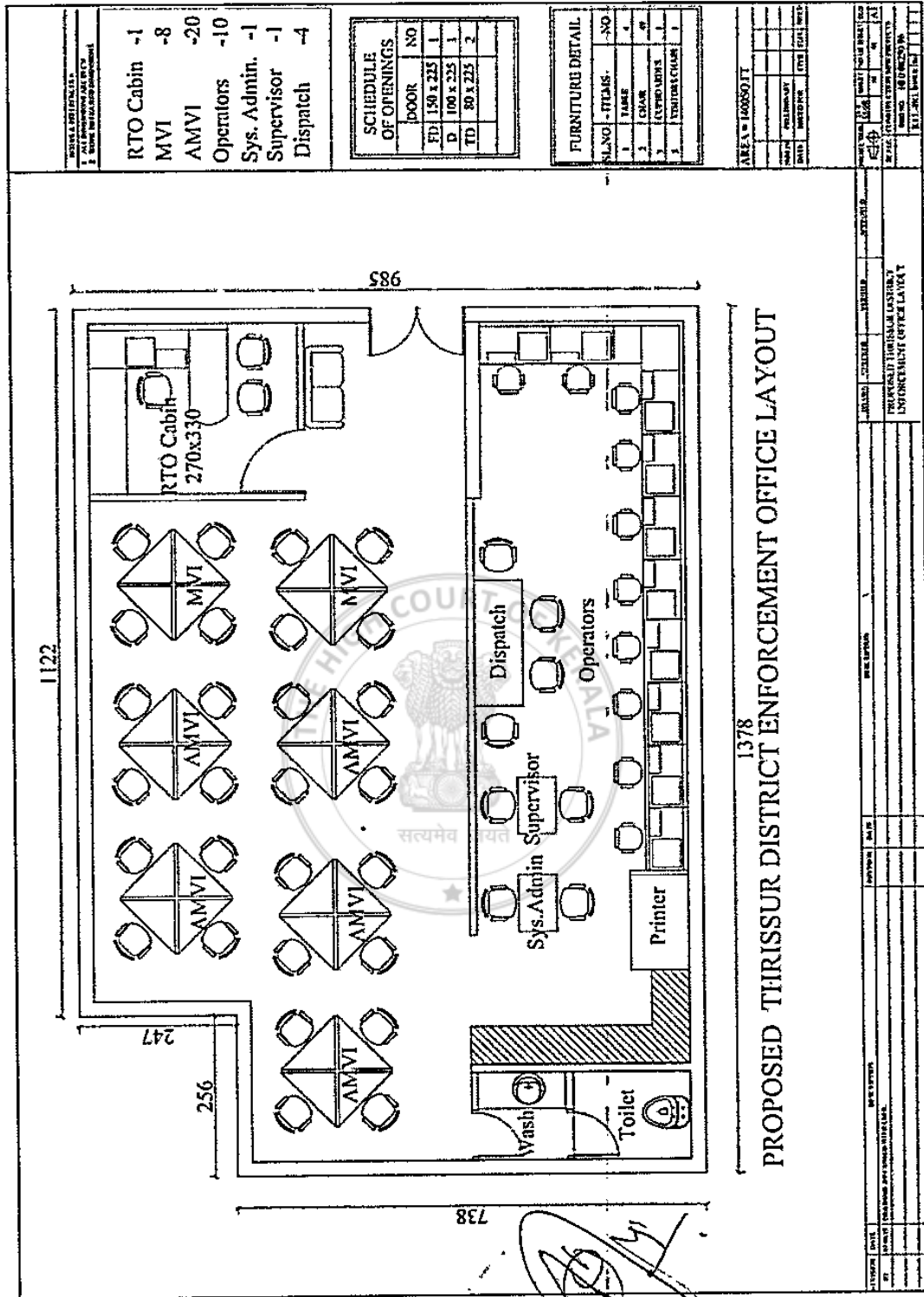
AREA = 122650 FT	
NO. OF DESKS	NO. OF CHAIRS
NO. OF OPERATORS	NO. OF SUPERVISORS
NO. OF DISPATCH	NO. OF PRINTERS

NO. OF OPERATORS	NO. OF SUPERVISORS
NO. OF DISPATCH	NO. OF PRINTERS
NO. OF DESKS	NO. OF CHAIRS
NO. OF OPERATORS	NO. OF SUPERVISORS
NO. OF DISPATCH	NO. OF PRINTERS

PROPOSED PATHANAMTHITTA DISTRICT ENFORCEMENT OFFICE LAYOUT

GOPAKUMAR S P
 Head CPE
 Communication Dept. No. 2, 2nd Floor, KCC
 Monale, Thiruvananthapuram - 695 002





PROPOSED THIRISSUR DISTRICT ENFORCEMENT OFFICE LAYOUT

WORKS & MATERIALS LIST

RTO Cabin	-1
MVI	-8
AMVI	-20
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS

DOOR	NO
FD	150 x 225
D	100 x 225
TD	80 x 225

FURNITURE DETAIL

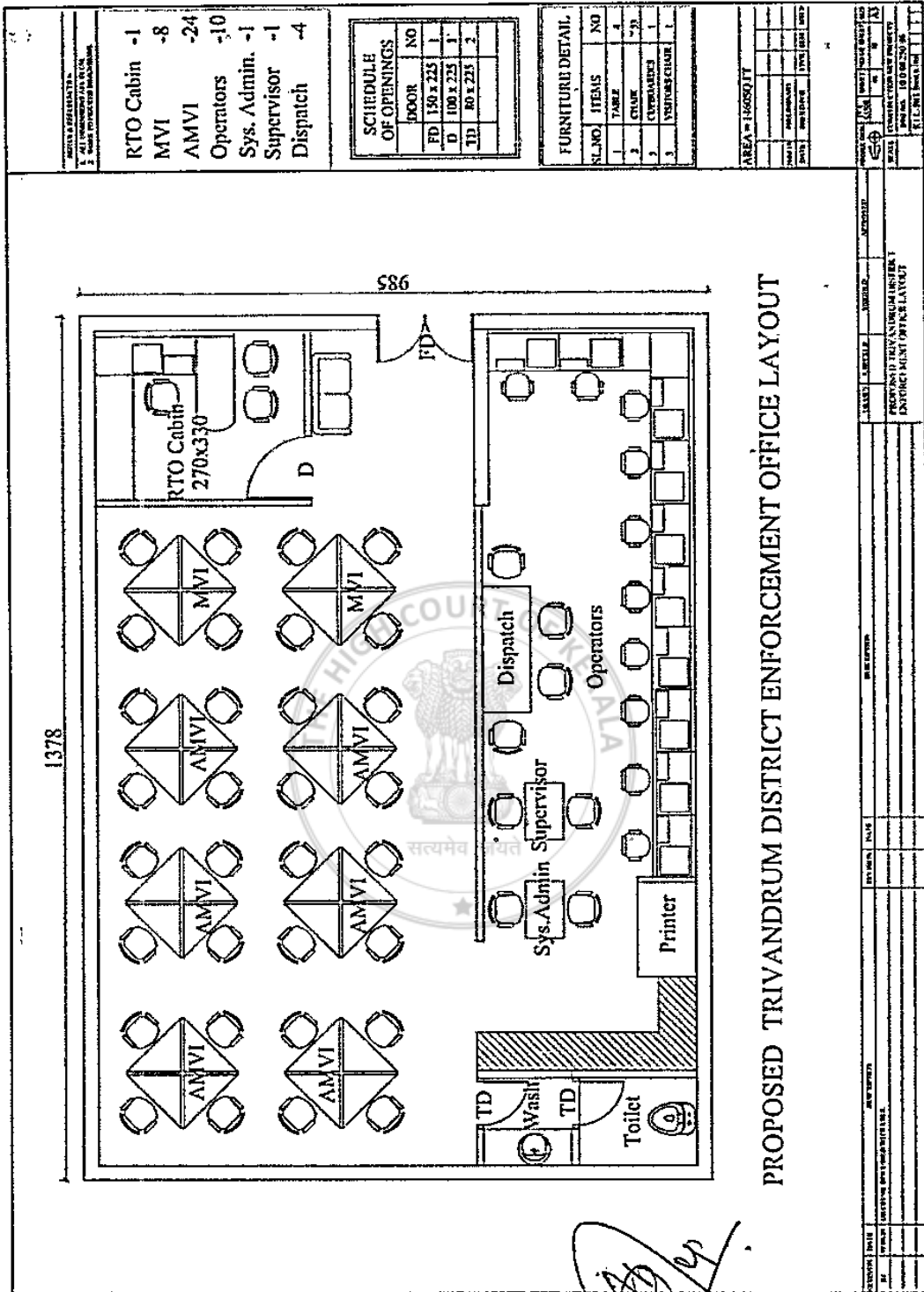
SLNO	ITEMS	NO
1	TABLE	4
2	CHAIR	40
3	OPERATORS	10
4	DISPATCH	4

AREA = 10080.17

DATE	PREPARED BY	CHECKED BY	DATE

COMPAK 4232 P
Head Ofc
Communication Projects Group, KCC
Muvila, Thiruvananthapuram 695 583





RTO Cabin	-1
MVI	-8
AMVI	-24
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-4

SCHEDULE OF OPENINGS	
DOOR	NO
FD	150 x 225 1
D	100 x 225 1
TD	80 x 225 2

FURNITURE DETAIL		
SL.NO	ITEMS	NO
1	TABLE	4
2	CHAIR	40
3	CHAIR	1
4	CHAIR	1

AREA = 146050 FT	
DATE	SCALE
PROJECT NO.	PROJECT NAME
DESIGNER	CLIENT
DATE	SCALE

SORAJUMAR SP

 732 626

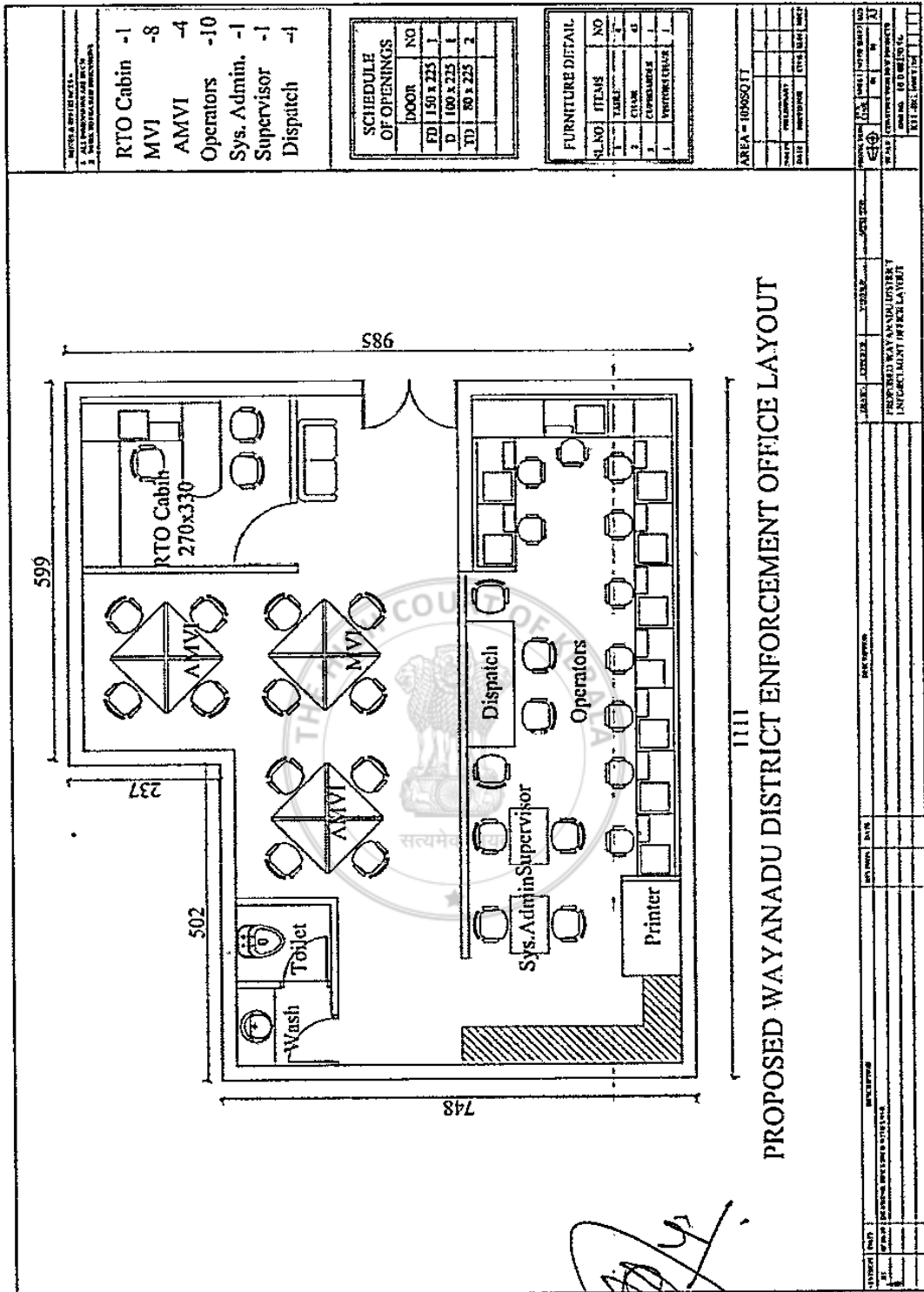
 COMMUNICATION DEVELOPMENT CORPORATION

 DIVISION

 KULATHOOR, TRIVANDRUM

 PIN: 695 888

 KERALA STATE ELECTRONICS DEVELOPMENT CORPORATION LIMITED



PROPOSED WAYANADU DISTRICT ENFORCEMENT OFFICE LAYOUT

REMARKS: 1. ALL WORKS TO BE COMPLETED WITHIN 30 DAYS FROM THE DATE OF APPROVAL.

RTO Cabin	-1
MVI	-8
AMVI	-4
Operators	-10
Sys. Admin.	-1
Supervisor	-1
Dispatch	-1

SCHEDULE OF OPENINGS

DOOR	NO
FD	150 x 225 1
D	100 x 225 1
TD	80 x 225 2

FURNITURE DETAIL

SL. NO	ITEMS	NO
1	TABLE	1
2	CHAIR	6
3	COMPLIMENTS	1
4	VERTICAL CURTAIN	1

AREA = 10650 FT²

DATE	10/05/2023
BY	[Signature]
FOR	10/05/2023
BY	[Signature]
FOR	10/05/2023

GOPAKUMAR S P
Head C/S
Communication Exp. Res. Group, KCS
Mony 23, Thiruvananthapuram



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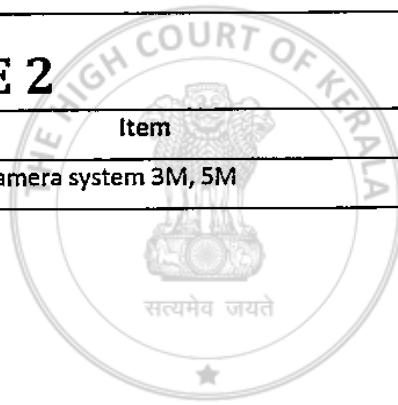
13. TOTAL ENFORCEMENT SYSTEM BOQ

13.1. PHASE 1

Sl. No.	Item	Qty
1	Smart AI – ANPR camera system 3M, 5M (50 x 14 districts)	675
2	Parking violation detection system	25
3	Red Light Violation Detection System	6
4	Mobile Speed Enforcement System	4
5	Fixed speed enforcement system	4
6	Control room software (central & district)	1
7	State Central Control Room HW including build up Area	1
8	District Enforcement Control Room HW & build up Area	12

13.2. PHASE 2

Sl. No.	Item	Qty
1	Smart AI – ANPR camera system 3M, 5M	700



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GOPAKUMAR S P
 Head of
 Communication
 Mobile Team

17/02/2023
 11:30 AM
 11/02/2023

KERALA STATE ELECTRONICS DEVELOPMENT CORPORATION
 COMMUNICATION DIVISION
 KULATHUR, TRIVANDRUM
 PIN: 695 583

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PART B: COMMERCIAL PROPOSAL

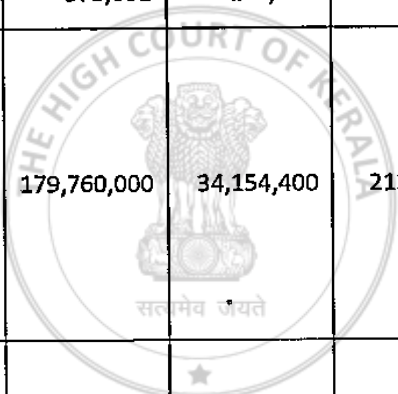
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GOPAKRISHNA P
Head of CS
Communication Services Group, KCC
Muvila, Thiruvananthapuram
KERALA STATE ELECTRONICS DEVELOPMENT CORPORATION
COMMUNICATION DIVISION
KULATHOOR, TRIVANDRUM
PIN: 695 583

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1. CAPEX FOR 5 YEAR BOOT WITH QUATERLY ASSURED PAYMENT

Sl. No.	DESCRIPTION	Unit Price	GST @18%+ 1% CESS	Unit Price with GST & CESS	Qty.	Total with GST & CESS
1	Radar Based Speed enforcement system, 2L 1R	4,989,254	947,958	5,937,212	4	23,748,847
2	Mobile Radar based SVDS with vehicle	5,670,000	1,077,300	6,747,300	4	26,989,200
3	Red Light Violation Detection System (RLVDS) 3 ARM	7,737,345	1,470,096	9,207,441	6	55,244,643
4	3 Megapixel AI Based ANPR Camera System	916,839	174,199	1,091,038	175	190,931,722
5	5 Megapixel AI Based ANPR Camera System	945,945	179,730	1,125,675	500	562,837,275
6	PTZ- AI Based ANPR Camera System	975,051	185,260	1,160,311	25	29,007,767
7	State Central Control Room- Civil, Electrical, Furnishing, Supporting Infrastructure, IT Infrastructure supply, Installation, Configuration and Commissioning & support	179,760,000	34,154,400	213,914,400	1	213,914,400
8	District Enforcement Control Room- Civil, Electrical, Furnishing, Supporting Infrastructure, IT Infrastructure supply, installation, Configuration and Commissioning & support	11,550,000	2,194,500	13,744,500	12	164,934,000
9	Laptop (i5, 1TB Hard Disk) for MVI; AMVI, RTO	157,500	29,925	187,425	354	66,348,450
10	Desktop (RTO, MVI, Supervisor, System Admin, Operators)	126,000	23,940	149,940	124	18,592,560
11	Heavy Duty Printer (Challan Printing)	830,000	119,700	949,700	14	10,495,800



GOPAKUMAR P. S.

 Head CPG

 Communication Projects Group, KGS

 Muvattupuzha, Thiruvananthapuram

KERALA STATE ELECTRONICS DEVELOPMENT CORPORATION

 COMMUNICATIONS DIVISION

 KULATHOOR, TRIVANDRUM

 PIN: 695 583



12	6 KVA Online UPS with 3 Hrs. Backup (District Control Room)	735,000	139,650	874,650	14	12,245,100
13	48 Port Gigabit Switch (District Control Room)	126,000	23,940	149,940	14	2,099,160
14	Firewall (District Control Room)	420,000	79,800	499,800	14	6,997,200
15	Control Room Management Software and Integration for General Enforcement processing (Tax, Insurance, PUC etc.), SOFTWARE Violation Memo processing, ,payment management etc. as per proposal, and third party software, licenses, AI licenses, ANPR licenses and Data fetching S/W for enforcing other offences form Vahan & Sarathy	168,000,000	31,920,000	199,920,000	1	199,920,000
16	AMC for 4rt & 5th year (cost includes all installation, commissioning, onsite support, warranty support etc.)	44,000,000	8,360,000	52,360,000	2	104,720,000
Total						1,689,026,124

TOTAL BOOT AMOUNT FOR FIVE YEAR =
Rs 1,41,93,49,648/-

GST 18% and CESS 1% =
Rs 26,96,76,440/-

TOTAL BOOT AMOUNT FOR FIVE YEAR INCLUDING GST & CESS =
Rs 1,68,90,26,124/-



(Signature)
 GOPALAKRISHNAN N
 Head, CPS
 Communication, Project 5 Group, KICC
 Muvattupuzha, Thiruvananthapuram. Phone: 635 563

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2. FACILITY MANAGEMENT SERVICES (FMS)

A. MANPOWER DEPLOYMENT						
CENTRAL CONTROL ROOM - Trivandrum						
Sl. No.	Item Description	Qty	Salary/ Month	Yearly	GST @ 18% Plus 1% Cess	Total
1	C R Manager	2	34,000	408,000	77,520	971,040
2	System Admin	2	28,370	340,440	64,684	810,247
3	Supervisor	Nil				
4	Operator	2	24,500	294,000	55,860	699,720
5	Helper	Nil				
6	Driver cum Technician	16	24,500	294,000	55,860	5,597,760
7	Diesel expenses for 4 Vehicles (Liters)	65000Ltr		4,550,000	864,500	5,414,500
8	Vehicle maintenance	4		380,000	72,200	452,200
	Total					13,945,467

DISTRICT CONTROL ROOM - Trivandrum (CAT - A)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28,370	340,440	64,684	405,124
3	Supervisor	1	26,500	318,000	60,420	378,420
4	Operator	8	24,500	294,000	55,860	2,798,880
5	Helper	1	18,500	222,000	42,180	264,180
	Total					3,846,604

DISTRICT CONTROL ROOM - Kollam (CAT - A)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	8	24500	294000	55860	2798880
5	Helper	1	18500	222000	42180	264180
	Total					3846603.6




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 Head CPG
 Communication Project Group, KCC
 Monvia, Thiruvananthapuram-555 583



DISTRICT CONTROL ROOM – Ernakulam (CAT - A)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	8	24500	294000	55860	2798880
5	Helper	1	18500	222000	42180	264180
	Total					3846603.6

DISTRICT CONTROL ROOM – TRISSUR (CAT - A)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	8	24500	294000	55860	2798880
5	Helper	1	18500	222000	42180	264180
	Total					3846603.6

DISTRICT CONTROL ROOM – CALICUT (CAT - A)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	8	24500	294000	55860	2798880
5	Helper	1	18500	222000	42180	264180
	Total					3846603.6



 GOPAKUMAR SP
 Head Crg
 Communication Projects Group, KCC
 Monvia, Thiruvananthapuram-695 583







DISTRICT CONTROL ROOM – MALAPURAM (CAT - A)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	8	24500	294000	55860	2798880
5	Helper	1	18500	222000	42180	264180
	Total					3846603.6

DISTRICT CONTROL ROOM – KOTTAYAM (CAT - B)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	5	24500	294000	55860	1749300
5	Helper	1	18500	222000	42180	264180
	Total					2797023.6

DISTRICT CONTROL ROOM -PALAKKAD(CAT - B)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	5	24500	294000	55860	1749300
5	Helper	1	18500	222000	42180	264180
	Total					2797023.6


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 Head CPG
 Communication Projects Group, KCC
 Monvilia, Thiruvananthapuram-695 583

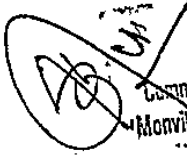




DISTRICT CONTROL ROOM - KANNUR(CAT - B)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	5	24500	294000	55860	1749300
5	Helper	1	18500	222000	42180	264180
	Total					2797023.6

DISTRICT CONTROL ROOM - IDUKKI (CAT - C)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	4	24500	294000	55860	1399440
5	Helper	1	18500	222000	42180	264180
	Total					2447163.6

DISTRICT CONTROL ROOM - ALAPPUZHA (CAT - C)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	4	24500	294000	55860	1399440
5	Helper	1	18500	222000	42180	264180
	Total					2447163.6


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DISTRICT CONTROL ROOM – PATHANAMTHITTA (CAT - C)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	4	24500	294000	55860	1399440
5	Helper	1	18500	222000	42180	264180
	Total					2447163.6

DISTRICT CONTROL ROOM – KASARAGODE (CAT - C)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	4	24500	294000	55860	1399440
5	Helper	1	18500	222000	42180	264180
	Total					2447163.6

DISTRICT CONTROL ROOM – WAYANAD (CAT - D)						
Sl. No.	Item Description	Qty	Salary/ Month	Salary/ Year	GST @ 18% Plus 1% Cess	Total
1	C R Manager	Nil				
2	System Admin	1	28370	340440	64683.6	405123.6
3	Supervisor	1	26500	318000	60420	378420
4	Operator	3	24500	294000	55860	1049580
5	Helper	1	18500	222000	42180	264180
	Total					2097303.6



 S. P. K. S. P.

 Head CPG

 Communication Projects Group, KCC

 Menara, Thiruvananthapuram-695 583





B. RECURRING EXPENSES

Sl. No.	Item Description	Qty	Per Month	Per Year	GST @ 18% Plus 1% Cess	Total
1	Power Charge for Central Control Room	1	95000	1140000	216600	1356600
2	Power Charge for Category A Type Control Room	1	30000	360000	68400	428400
3	Power Charge for Category B Type Control Room	1	25500	306000	58140	364140
4	Power Charge for Category C Type Control Room	1	21600	259200	49248	308448
5	Power Charge for Category D Type Control Room	1	20000	240000	45600	285600
6	Main Lease line Charge at Central Control Room- 200 Mbps	1	260000	3120000	592800	3712800
7	Secondary Lease line charge - 50 Mbps	1	56000	672000	127680	799680
8	Lease line for District control room - 20 MBPS	13	29000	348000	66120	5383560
9	Diesel charges(Liter)	2000	70	140000	26600	166600
10	Power charges for RLVDs	6	2500	30000	5700	214200
11	Power charges for SVDS	4	1900	22800	4332	108528
12	Internet charges for RLVDs	6	2000	24000	4560	171360
13	Internet charges for SVDS	4	2000	24000	4560	114240
14	Internet charges for Mobil SVDS	4	2200	26400	5016	125664
15	Internet charges for AI - ANPR Cameras	700	350	4200	798	3498600
	Total					17038420



GUDAKU AN B P
 Head CTRG
 Communication Projects Group / KCG
 Mobile: 9447020000, 9447020001

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C. CHALLAN PROCESSING & DESPATCH EXPENSES

Sl. No.	Description	Unit Price	Qty	GST @ 18% Plus 1% Cess	Total/ Year
1	Paper	20	2500000	9500000	59500000
2	Pre Printed Stationary				
3	Pre Printed Envelope				
4	Postage				
5	Toner Cost				
6	Labour				
7	Maintenance Kit for Printer				
8	Pre mailing Expenses				
	TOTAL				59500000

**TOTAL FMS FOR ONE YEAR =
Rs 11,24,71,040/-**

**GST 18% and CESS 1% =
Rs 2,54,29,702/-**

**TOTAL FMS FOR ONE YEAR INCLUDING GST & CESS =
Rs 13,38,40,538**

**TOTAL FMS FOR FIVE YEAR =
Rs 56,23,55,200/-**

**GST 18% and CESS 1% =
Rs 10,68,47,488/-**

**TOTAL FMS FOR FIVE YEAR INCLUDING GST & CESS =
Rs 66,92,02,688/-**

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Hqs 275
Communication Projects
Muvils, Thiruvananthapuram-895 583





3. PROJECTED CASHFLOW FOR THE PROJECT

REVENUE FROM DIFFERENT ENFORCEMENT SYSTEMS

Sl. No.	Enforcement System	Total No.s	Total Offence per Day	Fine Amount	Total Fine per Day	Total Fine Per Year
1	SVDS	4	80	1,000	80,000	28,000,000
2	RLVDS	6	180	1,000	180,000	63,000,000
3	Mobile SVDS	4	200	1,000	200,000	70,000,000
4	AI - ANPR Camera	700	7,000	1,000	7,000,000	2,450,000,000
TOTAL AMMOUNT FROM FINE WITHIN ONE YEAR (INR)						2,611,000,000

REALISATION OF FINE (Assuming 60% Fine Amount Realisation)- 1st YEAR

=
Rs 156Cr.

REALISATION OF FINE (Assuming 30% Less Violations from Previous Year)- 2nd YEAR =

Rs 109Cr.

REALISATION OF FINE (Assuming 20% Less Violations from Previous Year)- 3rd YEAR =

Rs 87Cr.

REALISATION OF FINE (Assuming 20% Less Violations from Previous Year)- 4th YEAR =

Rs 70Cr.

REALISATION OF FINE (Assuming 20% Less Violations from Previous Year)- 5th YEAR =

Rs 56Cr.

TOTAL ESTIMATED COLLECTION WITHIN 5 YEARS =

Rs 478 Cr

TOTAL AMOUNT TO BE GIVEN TO BOOT VENDOR =

Rs 236Cr

BALANCE AMOUNT TO GOVERNMENT =

Rs 242 Cr.

GOPAKUMAR S P
Head CPG
Communication Projects Group, KGC
Monvila, Thiruvananthapuram 695 583





4. COMMERCIAL PROPOSAL- ABSTRACT

**TOTAL CAPEX AMOUNT FOR FIVE YEAR =
Rs 1,41,93,49,648/-**

**TOTAL CAPEX FOR FIVE YEAR WITH GST &
CESS =
Rs 1,68,90,26,124/-**

**TOTAL FMS FOR FIVE YEAR =
Rs 56,23,55,200/-**

**TOTAL FMS FOR FIVE YEAR WITH GST &
CESS =
Rs 66,92,02,688/-**

**QUATERLY ASSURED PAYMENT TO THE
VENDOR INCLUDING CAPEX AND FMS
RS= 9,90,85,242/-**

**QUATERLY ASSURED PAYMENT TO THE
VENDOR INCLUDING CAPEX AND FMS WITH
GST AND CESS
RS= 11,79,11,440/-**

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Head - SF
Communication Projects Group, KCC
Muvattupuzha, Thiruvananthapuram-695 583



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5. TERMS & CONDITIONS

1. Delivery and Installation: 9 months from the date of Purchase Order.
2. Price: Quoted are inclusive of GST & CESS
3. Warranty is for five year comprehensive on site
4. AMC Charges for 6th and 7th year: 5% of the total quoted value per year extra
5. Training: Training and documentation for operation of system will be given without any additional charge to MVD personnel as required
6. Permission for installation of, Enforcement Camera Systems at road side should be provided by Government without any additional charges
7. Permission to access vehicle owner – license database should be provided by the Department.
8. Space for building up control room should be provided by Department.
9. All recurring cost like Power charges, connectivity charges, Consumable Charges, Challan processing and dispatch are included in the FMS
10. Permission from other Department: MVD shall facilitate other department permissions if any for performing the installation work
11. Payment: 20 equal assured installments on quarterly basis within 5 years.
12. Any deviation on taxes and duties at the time of billing is applicable
13. The proposed Project is on BOOT model for 5 years.
14. The total project cost proposed is inclusive of CAPEX and OPEX
15. Validity of the proposal is 6 Months

Thanking you,

Yours faithfully,

FOR KERALA STATE ELECTRONICS

DEVELOPMENT CORPORATION LTD.

Gopakumar S P

Head – Keltron Communications Division,

Monvila, Kulathur (PO), Thiruvananthapuram – 695583

Phone: 04712598948 Mob. No. 09447210533

Email: spgopan@yahoo.com, e-mail: keltronseu@gmail.com



106



GOVERNMENT OF KERALA

Abstract

Transport Department – IT based projects - Evaluation and vetting of proposals - Technical Committee constituted – Orders issued.

TRANSPORT (A) DEPARTMENT

G.O.(Rt)No.559/2019/TRANS Dated,Thiruvananthapuram, 17/12/2019

Read: G.O(Ms) No. 18/2017/ITD dated 23.07.2017.

ORDER

Government are pleased to constitute a Technical Committee with the following composition for evaluation and vetting of proposals of IT based projects under Transport Department in Government

1. Principal Secretary, Transport Department
2. Transport Commissioner
3. Director, KSITM (Kerala State IT Mission) / Representative of the Director
4. Representative from State e-Governance Mission Team
5. Nodal Officer, 'Safe Kerala' project.

(By order of the Governor)
K R JYOTHILAL
PRINCIPAL SECRETARY

Transport Commissioner, Thiruvananthapuram.

Road Safety Commissioner, Kerala Road Safety Authority,
 Thiruvananthapuram.

Chairman & Managing Director, Kerala State Road Transport Corporation,
 Thiruvananthapuram.

123685/2020/INWARD TC

File No. TRANS-A2/258/2019-TRANS¹

333/355



GOVERNMENT OF KERALA

Transport (A) Department

No. TRANS-A2/258/2019-TRANS

14/01/2020, Thiruvananthapuram

From

Principal Secretary to Government

To

1. The Transport Commissioner,
Trans Towers, Vazhuthacaud, Thiruvananthapuram.
2. Director, Kerala State IT Mission (KSITM),
ICT Campus, Vellayambalam, Thiruvananthapuram - 695 033.
3. Regional Transport Officer (Nodal Officer for Safe Kerala Project)
Regional Transport Office, Civil Station, Alappuzha.

Sir,

Sub:- Transport Department - Evaluation and vetting of the project proposal for implementing 'Fully Automated Traffic Enforcement System' for 'Safe Kerala' project - Minutes of the Technical Committee meeting held on 28.12.2019 - Forwarding of - Reg.

Ref:- Government letter of even number dated 23.12.2019.

I am to forward herewith a copy of the minutes of the Technical Committee meeting held on 28.12.2019, for evaluation and vetting of the project proposal for implementing 'Fully Automated Traffic Enforcement System' for 'Safe Kerala' project, for information and necessary action.

Yours faithfully,

MALATHY.S.**ADDITIONAL SECRETARY**

For Principal Secretary to Government.

Approved for issue,

Section Officer.

Copy to :- PA to Principal Secretary (Transport)

123685/2020/INWARD TC

File No.TRANS-A2/258/2019-THANS

334/355

Minutes of the meeting of the Technical Committee held on 28.12.2019 in the chamber of the Principal Secretary (Transport) for evaluation and vetting of the project proposal for 'Fully automated traffic enforcement system' for 'Safe Kerala' project

The meeting commenced at 11.40 am under the Chairmanship of Principal Secretary (Transport). The following officials attended the meeting

1. Smt. R. Sreelekha IPS, Transport Commissioner
2. Shri. Rajeev Puthalath, Joint Transport Commissioner
3. Shri. Santhosh Kumar, Senior Consultant, Kerala State IT Mission
4. Shri. Gopakumar.I.P, Head (Commercial Division), Keltron
5. Shri. Shibu.K.Itty, Nodal Officer, 'Safe Kerala' project

The Senior Consultant, KSITM pointed out that Keltron has prepared and forwarded project proposals for automated traffic enforcement system to both Police Department and the Motor Vehicle Department. Hence it should be ensured that the infrastructure to be developed under the project should not get duplicated by both the Departments to avoid wastage of infrastructure.

The Transport Commissioner clarified that traffic management is the duty of Police Department whereas traffic enforcement is solely being maintained by Motor Vehicle Department. Hence the purpose of automated systems implemented by these departments are different. Motor Vehicle Department is entitled to impose penalty for traffic violations including licence suspension, cancellation of licence etc. Since 'Safe Kerala' is the traffic enforcement programme exclusively being implemented by Motor Vehicle Department, the fully automated enforcement system proposed is highly essential for the effective implementation of the project. It is also pointed out that in other states, traffic management and traffic enforcement are being done by Police and the Motor Vehicle Departments separately.

The representative of Keltron has also pointed out that there is no duplication of infrastructure developed for Police Department and the Motor Vehicle Department

123685/2020/INWARD TC

File No.TRANS-A2/258/2019-TRANS

335/355

till now.

Principal Secretary (Transport) directed to ensure that cameras under the project are not installed in the same location by different agencies. For this, data sharing between Police Department and the Motor Vehicle Department is necessary. Motor Vehicle Department should identify the locations in which cameras are to be installed and share this data with Police Department so as to avoid wastage / overlapping of infrastructure. Principal Secretary also pointed out that a good number of cameras installed by different agencies as part of traffic management / enforcement are not working as observed in the review meeting held by the Hon'ble Chief Minister. Hence it should be monitored whether the cameras installed under this project are working. He also directed that the AMC for maintaining the cameras should be given for a period of 10 years.

The Principal Secretary asked whether the facilities of State Data Centre under Kerala State IT Mission can be made available to Motor Vehicle Department for collection of data from the new cameras. Representative of KSITM informed that there are practical difficulties in accommodating data afresh under SDC. The Joint Transport Commissioner informed that the data centre under Vahan Sarathy can be used free of cost when linked to Vahan Sarathy.

After detailed discussions, the Technical Committee approved the boot model of the proposal submitted by Motor Vehicle Department for implementing fully automated traffic enforcement system for 'Safe Kerala' project subject to certain conditions as mentioned below.

The meeting ended at 12.25 pm.

Decision of the Technical Committee

Approved the proposal submitted by Motor Vehicle Department for implementing 'Advanced automated traffic enforcement system on boot model for 5 years and Facility Management Services for 5 years' under 'Safe Kerala' Project, subject to the following Conditions

- i. The Motor Vehicle Department should identify the exact location in which cameras are to be installed and share this data with Police Department to avoid duplication / wastage of infrastructure. It

123685/2020/INWARD TC

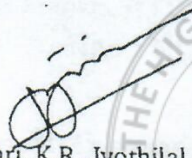
File No. TRANS-A2/258/2019-TRANS

336/355

should be ensured that cameras are not installed in the same location by different agencies.

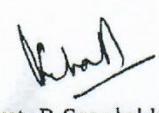
ii. The data collected through the cameras may be shared with Police Department on a need based strategy.

iii. It should be frequently monitored to ensure whether the cameras installed under the project are working. AMC for maintaining the cameras should be given for an extended period of 10 years.



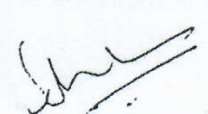
Shri. K.R. Jyothilal

Principal Secretary (Transport)




Smt. R.Sreelekha

Transport Commissioner



Shri. Santhosh Kumar

Sr. Consultant, KSITM



Shri. Shibu.K.Itty

Nodal Officer (Safe Kerala)

130528/2020/INWARD TC

File No.TRANS-A2/258/2019-TRANS

342/355

ANNEXURE - 3

GOVERNMENT OF KERALA

Abstract

Transport Department - Safe Kerala Project - Advanced automated traffic enforcement system - Administrative Sanction accorded - Orders issued.

TRANSPORT (A) DEPARTMENT

G.O.(Rt)No.134/2020/TRANS Dated,Thiruvananthapuram, 27/04/2020

Read 1 Letter dated 17.06.2019 submitted by the Nodal Officer, Safe Kerala Project.

2 Letter No.E1/37/2019 dated 12.07.2019, 25.07.2019 and 25.10.2019 from the Transport Commissioner.

3 G.O.(Rt) No. 559/2019/Trans dated 17.12.2019.

ORDER

The Transport Commissioner has forwarded a proposal for Fully Automated Traffic Enforcement System for Safe Kerala to ensure a constant high profile presence and cohesive enforcement protocols. The detailed proposal for Fully Automated Traffic Enforcement System for Safe Kerala Project submitted by KELTRON was evaluated by the technical committee constituted as per Government Order read as 3rd paper above.

2. Administrative Sanction is accorded for implementing Fully Automated Traffic Enforcement System on Boot model for five years and Facility Management Services for five years under Safe Kerala Project subject to the following conditions:

1. KELTRON may act as a PMC and a vendor be chosen through a transparent bidding process.

2. KELTRON to detect vehicles violating traffic rules. Transport Commissioner must ensure that there is no overlap with the cameras of State Police Chief.

130528/2020/INWARD TC

File No.TRANS-A2/258/2019-TRANS

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3. The Technical Committee should monitor the implementation of the project at each and every stage of its implementation.

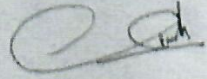
4. The Motor Vehicles Department should execute a Service Level Agreement (SLA) with KELTRON for implementation of the project and the conditions put forth by the Technical Committee in its meeting held on 28.12.2019 should be incorporated in the SLA.

(By order of the Governor)
K R JYOTHILAL
PRINCIPAL SECRETARY

The Transport Commissioner, Thiruvananthapuram.
The Road Safety Commissioner, Kerala Road Safety Authority,
Thiruvananthapuram.
The Director, Kerala State IT Mission (KSITM), Vellayambalam,
Thiruvananthapuram.
The Head, State e-Governance Mission Team, Uppalam Road, Statue,
Thiruvananthapuram.
The Nodal Officer, 'Safe Kerala' project (through Transport
Commissioner)
The Principal Accountant General (Audit/A&E), Kerala,
Thiruvananthapuram.
Finance Department.
Electronics & Information Technology (IT Cell) Department
Information & Public Relations (Web & New Media) Department.
(For publishing in the official website).
Stock file / Office copy

Copy to:- P.S. to Minister (Transport)
P.A. to Principal Secretary (Transport)

Forwarded /By order


for Section Officer

File No.E1/37/2019-TC

E1/37/2019/TC

Transport Commissionerate,
Thiruvananthapuram
Dated: 14/05/2020

From

The Transport Commissioner, Kerala

To

The Managing Director,
Kerala State Electronics Development Corporation Ltd.,
Keltron Communication Group,
Keltron Communication Complex,
Monvila, Kulathur P.O
Trivandrum 695583

Sir,

Sub: - Motor Vehicles Department – Safe Kerala Project – Advanced Automated Traffic Enforcement System – Setting up of entire infrastructure and Facility Management Services – Work Order – issued – reg.

- Ref: - 1. G.O. (Rt) No. 42/2018/Trans dated 04/06/2018 and G.O. (Rt) No. 44/2018/Trans dated 16/06/2018
2. Proposal no. KCC/SEU/G36/IT/2019-20 dated 22/08/2019 from KELTRON.
3. This office letter of even no. dated 25/10/2019.
4. G.O. (Rt) No. 134/2020/Trans dated 27/04/2020
5. G.O. (Rt) No. 559/2019/Trans dated 17/12/2019
6. Minutes of the meeting of the Technical Committee held on 28/12/2019

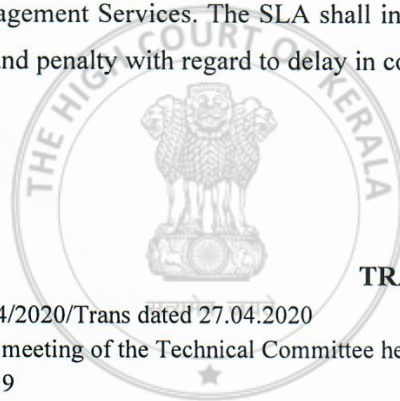
As per reference 1st cited, Government had accorded Administrative Sanction to set up a Safe Kerala Project with an aim to reduce road accidents and efficient enforcement of traffic rules. Keltron vide reference 2nd cited had submitted a detailed commercial and technical proposal for setting up the Fully Automated Traffic enforcement Systems ,Control rooms,infrastructure and Facility Management Services related to Safe Kerala for a period of five years on BOOT model . Vide reference 3rd cited, Government was requested to accord Administrative Sanction to entrust Keltron for implementation of the project and vide reference 4th cited, Government had accorded Administrative Sanction to entrust the implementation of the project with Keltron on BOOT (Built Operate Own Transfer) model for five years and Facility Management Services for five years subject to the conditions specified in the Government Order G.O. (Rt) No. 134/2020/Trans dated 27/04/2020.

Hence, Work Order is issued to KELTRON for setting up the entire infrastructure including required civil work and five year Warranty service on BOOT model for a period

File No.E1/37/2019-TC

of five years at a total cost of **Rs. 1,68,90,26,124/- (Rupees One Hundred and sixty eight Crores Ninety Lakhs Twenty Six Thousand One Hundred and Twenty Four only)** inclusive of all taxes and Facility Management Services for five years at a total cost of **Rs. 66,92,02,688/- (Rupees Sixty Six Crores Ninety Two Lakhs Two Thousand Six Hundred and Eighty Eight only)** inclusive of all taxes.

1. KELTRON shall adhere to all the works, deliverables, project components and payment terms as is specified in the proposal submitted vide reference 2nd cited and the decisions of the Technical Committee vide reference 6th cited.
2. KELTRON may act as a PMC and a vendor be chosen through a transparent bidding process
3. KELTRON shall submit separate draft Service Level Agreement (SLA) within two weeks on receipt of this work order with regard to implementation of BOOT model and Facility Management Services. The SLA shall include in detail the terms relating to the downtime and penalty with regard to delay in completion and other works.



Signature Validly

Digitally signed by R
SREEDEKHA
Date: 2020.05.14
12:25:37 IST**R. SREEDEKHA IPS**
TRANSPORT COMMISSIONER

- Encl: (i) G.O(Rt)No. 134/2020/Trans dated 27.04.2020
(ii) Minutes of the meeting of the Technical Committee held on
28/12/2019

WHEREAS, KELTRON has submitted a detailed proposal for Fully Automated Traffic Enforcement System for Safe Kerala Project administered by the Kerala Motor Vehicles Department;

AND WHEREAS, the Technical Committee constituted by the Government in its meeting held on 23-12-2019 has approved the proposal submitted by the Motor Vehicles Department for implementing Advanced Automatic Traffic Enforcement System on BOOT model for 5 years and Facility Management Services for 5 years under Safe Kerala Project subject to certain conditions;

AND WHEREAS, Government in Transport Department has accorded Administrative Sanction for implementing Fully Automated Traffic Enforcement System on BOOT model for 5 years and Facility Management Services for 5 years under Safe Kerala Project subject to the following conditions namely:-

- (i) KELTRON may act as PMC and a vendor be chosen through a transparent bidding process.
- (ii) KELTRON to detect vehicles violating traffic rules. Transport Commissioner must ensure that there is no overlap with the cameras of State Police Chief.
- (iii) Technical Committee should monitor the implementation of the project at each and every stage of its implementation.
- (iv) Motor Vehicles Department should execute a Service Level Agreement (SLA) with KELTRON for implementation of the project and the conditions put forth by the Technical Committee in its meeting held on 28-12-2019 should be incorporated in the SLA;

AND WHEREAS, Work Order was issued to KELTRON for setting up the entire infrastructure including required civil works and five year warranty service on BOOT model for a period of five years at a total cost of Rs. 1,68,90,26,124/- (Rupees One hundred and sixty eight crores ninety lakhs twenty six thousand one hundred and twenty four only) inclusive of all taxes and Facility Management Services for five years at a total cost of Rs. 66,92,02,688/- (Rupees Sixty six crores ninety two lakhs

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Managing Director



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TRANSPORT COMMISSIONER
KERALA

two thousand six hundred and eighty eight only) inclusive of all taxes with certain conditions;

And whereas the KELTRON have been pleased to accept the conditions enumerated by Motor Vehicles Department in the Work Order issued as per No. E1/37/2019/TC dated 14/05/2020 and proposal No. KCC/SEU/G36/IT/2019-20, dated 22.08.2019 from KELTRON and the recommendations of the Technical committee meeting held on 28/12/2019;

NOW THEREFORE, IN CONSIDERATION OF THE AFORESAID DECISIONS, THE PARTIES HEREBY AGREED AS FOLLOWS:-

PURPOSE OF THE AGREEMENT

This agreement is for the work for the supply, installation, commissioning and warranty support for Fully Automated Traffic Enforcement System, Based on BOOT Model for 5 years including Facility Management Services for 5 years

SCOPE OF THE AGREEMENT

KELTRON agrees to undertake the work as PMC and a vendor be chosen through transparent bidding process for the total system design, site survey, manufacturing of Enforcement Systems, Installation, commissioning, Design of District & State Central control rooms, Installation of Control rooms including civil works, supply, installation, commissioning of IT infrastructure at Control rooms, overall management, Total Project commissioning and 5 Year warranty support for 'ADVANCED AUTOMATED TRAFFIC ENFORCEMENT SYSTEM BASED ON BOOT MODEL FOR 5 YEARS AND FACILITY MANAGEMENT SERVICES FOR 5 YEARS UNDER SAFE KERALA PROJECT'.

- 1. KELTRON shall adhere to all the works, deliverable, project components and payment terms as is, specified in the KELTRON proposal No. KCC/SEU/G36/IT/2019-20 dated 22.08.2019 and the conditions stipulated in

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 Managing Director



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 TRANSPORT COMMISSIONER
 KERALA

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the work order issued by Motor Vehicles Department No. E1/37/2019/TC dated 14/05/2020 and as per the conditions in the Administrative Sanction accorded vide G.O.(Rt) No. 134/2020/TRANS dated 27.04.2020.

2. CONTRACT DOCUMENTS

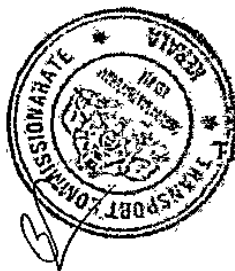
- a. KELTRON proposal No. KCC/SEU/G36/TF/2019-20 dated 22.08.2019- ANNEXURE-1.
- b. Minutes of the Technical Committee held on 28-12-2019- ANNEXURE-2.
- c. Government Order G.O.(Rt)No. 134/2020/TRANS dated 27.04.2020 -- ANNEXURE-3.
- d. Work Order issued by Motor Vehicles Department No. E1/37/2019/TC dated 14/05/2020 -- ANNEXURE-4.
- e. Undertaking by KELTRON -- ANNEXURE-5.


3. DEFINITIONS:

In this Agreement, unless the context otherwise requires:-

- (a) "Agreement" means this agreement and includes all attachments, appendices, all document incorporated by references thereto together with any subsequent modifications, the bid offer, the acceptance and all related correspondences, clarifications and presentations.
- (b) "Contract" is used synonymously with Agreement.
- (c) "MVD" means Motor Vehicles Department.
- (d) "KELTRON" means Kerala State Electronics Development Corporation Limited.
- (e) "FMS" means Facility Management Services required to be provided by the KELTRON as per the terms of this agreement.
- (f) "Law" means any Act, notifications, bye-laws, rules and regulations, directive, ordinance, order or instruction having the force of law enacted or


Hemalatha T R
Managing Director




R. SREELEKHA IPS
TRANSPORT COMMISSIONER
KERALA

issued by the Government of India or State Government or regulatory authority or political sub-division of Government agency.

(g) "Service" means all the services required to be provided by the KELTRON as per the terms and conditions of the proposal and this agreement.

(h) "SLA" means Service Level Agreement.

(i) "CAPEX" means Capital Expenditure.

(j) "OPEX" means Operational Expenditure.

(k) "BOOT" means Build Own Operate and Transfer.

(l) "O.S" means Operating System.

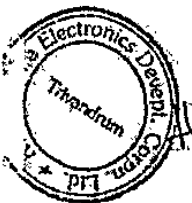
(m) "Go Live" means the date as decided by the Technical Committee on the basis of the Evaluation Report from the District Enforcement RTO's concerned.

4. CONTRACT PRICE AND TERMS OF PAYMENT

a. Total Contract value: The Motor Vehicles Department do hereby agree to pay to KELTRON a total amount of Rs. 2,35,82,28,812/- (Rupees Two Thirty Five Crores Eighty Two Lakhs Twenty Eight Thousand Eight Hundred and Twelve only) OR the amount which will be finalised after bidding process, whichever is less inclusive of all taxes. The amount also includes 5% cent charge payable to KELTRON.

b. The total CAPEX value is Rs. 1,68,90,26,124/- (Rupees One hundred and sixty eight crores ninety lakhs twenty six thousand one hundred and twenty four only) and total FMS value for 5 years is Rs. 66,92,02,688/- (Rupees Sixty six crores ninety two lakhs two thousand six hundred and eighty eight only) inclusive of all taxes total amounting to Rs. 2,35,82,28,812/- (Rupees Two Thirty Five Crores Eighty Two Lakhs Twenty Eight Thousand Eight Hundred and Twelve only) inclusive of all taxes.

c. Payment Terms: Quarterly assured payment of Rs 11,79,11,440/- (Rupees Eleven Crores Seventy Nine Lakhs Eleven Thousand Four Hundred and Forty only) including applicable tax in 20 instalments starting from first quarter after go live. KELTRON will be required to submit the



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Managing Director



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TRANSPORT COMMISSIONER
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following reports (district wise) signed by the respective Head of the Office at the end of every quarter to effect the payment:-

- (i) Performance Certificate.
- (ii) Preventive Maintenance Report.
- (iii) List of employees along with Monthly attendance and wage details.
- (iv) Downtime penalty statement.
- (v) Asset Register.
- (vi) Monthly Notice Report.

d. The quarterly payment includes FMS charges also.

e. Payment for charge memo shall be on actual basis per charge memo based on the charge memos generated and dispatched.

5. OTHER TERMS AND CONDITIONS OF THE PROJECT:-

- a. Completion of the project: Within 10 months from the date of signing of the SLA. On completion of the project, each of the sites shall be subjected to the test by the Technical Committee and after having certified the same satisfactorily it shall be deemed to have been accepted by the MVD.
- b. Price: Contract price is all inclusive of GST, CESS and all other statutory Duties or Taxes. (Any change in GST at the time of billing is applicable).
- c. Warranty: Is for 5 year onsite comprehensive included from the date of commissioning of the project in each district.
- d. The AMC charges for 6th & 7th year shall be at the rate of 5% per annum which is not included in the price. The AMC charges for 8th, 9th and 10th year shall be entered on mutually agreed terms between MVD and KELTRON.
- e. Training: Training & Documentation for the operation of the systems will be given to MVD officers as required without any additional charge.
- f. Installation of Enforcement cameras: All permissions for the installation of enforcement camera systems at road side shall be provided by MVD without any delay.
- g. Access to VAHAN: Permission to access vehicle database from VAHAN shall be provided by MVD without any delay.

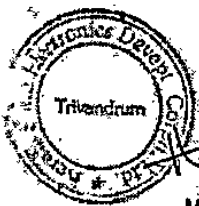


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Managing Director



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TRANSPORT COMMISSIONER,
KERALA

- h. Sufficient space for building up District & State control rooms shall be provided by MVD without delay.
- i. Permissions from other departments: MVD shall facilitate other department permissions if any for performing the installation work.
- j. The proposed project is on BOOT model for 5 years.
- k. The total project cost proposed is inclusive of CAPEX and OPEX.
- l. All recurring cost like power charges, connectivity charges, consumable charges for enforcement chellans, chellan processing and despatch charges, Manpower charges are included.
- m. After the bidding process, KELTRON shall enter into an agreement with the vendor chosen for the implementation of the project and ensure that the project is completed as per the terms and conditions enumerated in the proposal without any deviation.
- n. MVD shall have the right to cancel the contract for any default on the part of KELTRON in the due performance thereof with valued reason. The cancellation shall be made only after giving due notice to KELTRON and after due process of the explanation/rectification/clarification given by KELTRON.
- o. It shall be lawful for MVD to pay to KELTRON from and out of any moneys for the time being payable or due to the KELTRON from MVD under this contract or otherwise to set off any loss, expense, cost or damages, sustained or incurred by the MVD by reason of the cancellation of the contract.
- p. KELTRON agrees that any communication addressed to them may be handed over to the registered office address or may be sent to the address as mentioned in the agreement.
- q. The percentage of taxes and duties quoted in the proposal, if any, should be indicated clearly. If there is any reduction or increase in the percentage on the rate of taxes & duties, the same should be passed on to MVD.
- r. Penalty: In case KELTRON could not supply as per the agreement without sufficient reasons within the specified delivery period penalty will be charged @ 0.1% per month of the balance contract value to be performed



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subject to a maximum of 10%. (If any problem which will be out of control of KELTRON, that period will be excluded from counting the penalty).

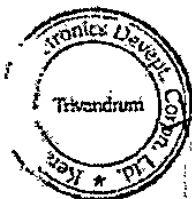
- s. In case the contract is not completely and satisfactorily performed by KELTRON, MVD has the right to terminate the contract at the risk and cost of KELTRON.
- t. In case the number of enforcement from one camera during one month is less than 300 numbers then that cameras shall be relocated after discussion with the MVD officials.

6. PERFORMANCE GUARANTEE

- a. The offer shall be inclusive of a comprehensive onsite Performance Guarantee for 5 years for all the items from the date of commissioning. KELTRON shall maintain systems and peripherals supplied and installed under this contract in accordance with the provisions laid down in the clauses below.
- b. Scope and Services covered under performance Guarantee:
 - KELTRON shall provide the following services under the performance guarantee to keep the systems and peripherals in good working order.
 - (i) Application Support: The supply is comprehensive inclusive of Back end Applications including OS support on all the systems supplied and installed under this contract against any manufacturing defect. Any problem related with Applications shall be attended & rectified by KELTRON. All required device drivers shall be provided by KELTRON.
 - (ii) Scheduled preventive maintenance (PM) shall be carried out once in Three Months for all systems.

7. SERVICE ASSURANCE:

KELTRON shall also ensure an availability of minimum 95% for all the systems & accessories on a yearly basis. This means that all the systems & accessories covered under this performance guarantee shall be in operating



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Managing Director



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TRANSPORT COMMISSIONER
KERALA

condition at least on 95% of the normal working hours in a year.

8. DOWNTIME PENALTY (against any manufacturing defect)

(a) Downtime penalty will be charged for after 48 Hours.

- (i) The downtime penalty will be Rs.100 per week per Field hardware unit.
- (ii) The downtime penalty will be Rs.100 per day per Desktop computer
- (iii) The downtime penalty will be Rs.200 per day per UPS.
- (iv) The downtime penalty will be Rs.200 per day per Switches/Router.
- (v) The downtime penalty will be Rs.300 per week per Server & Storage.
- (vi) The downtime penalty will be Rs.500 per week for backend applications
- (vii) The downtime penalty will be Rs.1000 per day for each District Control Room shutdown.
- (viii) The downtime penalty will be Rs.10,000 per day for State Central Control Room shutdown.

(b) Any man power absent on a particular day shall be treated as Downtime and the salary corresponding to number of days absence shall be deducted from the payment (except public holidays, Sundays and 12 casual leaves for one year).

(c) Notices of offences recorded on the system on a particular day shall be generated and printed and dispatched within 7 working days of download date. Penalty @ Rs.3/- per challan shall be levied if notices are kept pending for more than 7 working days. KELTRON shall not be responsible for delay in sending notices due to reasons beyond the control of KELTRON.

9. TERMS OF PERFORMANCE GUARANTEE

- a. If MVD is not able to hand over the system to KELTRON for maintenance purpose, such time will not be considered for the down time penalty.
- b. In case of intermittent failures and repetitive problems due to improper diagnosis or repair, the system will be treated as continuously down.
- c. KELTRON is not liable for problems arising out of breakdown or services



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Managing Director



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TRANSPORT COMMISSIONER
KERALA

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or spares cost, arising out of damages caused due to mishandling of any equipment by MVD, fire, theft, riots, accidents, earthquakes, storm and other natural calamities.

- d. MVD will keep a System Maintenance Register (at mutually agreed location) which is a record of machine failure including the nature of failure, date and time of booking the complaint, when the machine was put back in to service and the total down time. This record will be signed mutually by the authorized officer of the MVD and by KELTRON's Service Engineer.
- e. To monitor the overall performance of the project, maintenance activities and other project related matters, periodic meeting between MVD and KELTRON shall be held at Transport Commissionerate, Thiruvananthapuram.
- f. The failure of performance due to failure on the part of KSEB & BSNL or due to Natural Calamities, any pandemic situations, Riot, Damage due to Accident or Theft will not be liable by KELTRON at any extent.
- g. The performance issue or failure due to improper handling or due to consumables will not be liable by KELTRON.

10. FORCE MAJEURE.

In case of unforeseen events such as war, KELTRON shall not be liable or deemed to be default of any delay or failure in performance stated herein resulting directly or indirectly from causes beyond his reasonable control. If KELTRON is prevented from performing their functions under the instrument for a period longer than six months due to fire, theft, earthquake, flood, accidents, riots, lockdowns, any natural calamities or any pandemic situation etc, the KELTRON's liability ceases. If a Force Majeure situation arises, the KELTRON shall promptly notify MVD in writing on such conditions, the cause thereof and the change that is necessitated due to the conditions. Until and unless otherwise directed by MVD in writing, the KELTRON shall continue to perform its obligations under the agreement as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the



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Mohanathra T.R.
Managing Director



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TRANSPORT COMMISSIONER
KERALA

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Force Majeure event. Then both the parties shall discuss the course of action to be taken afterwards.

11. All the quarterly payment will only be made as per the contract. And maximum allowable delay shall be 10 days.

12. In case the KELTRON fails to supply and deliver any of the said products and services within the time provided for delivery of the same or in the case the KELTRON commits any breach of any of the covenants, stipulation and agreement herein contained and on his part to be observed and performed, then and in any such case, it shall be lawful for the MVD (If he deems fit to do so) to arrange for the purchase of the said articles and equipment's elsewhere, or, on behalf of the MVD, by an order in writing of the MVD, to put an end to this contract; and in case MVD shall have incurred, sustained or been put to any costs, damages or expenses by reason of such purchases or by reason of this contract having been so put an end to or in case any difference in price, compensation loss costs, damages or expenses or other money shall then or at any time during the continuance of this contract be payable by the KELTRON to the MVD under and by virtue of this contract it shall be lawful for the MVD from and out of any moneys for the time being payable or owing to the KELTRON from the MVD under or by virtue of this contract or otherwise to pay and reimburse to the MVD all such costs damages and expenses they may have sustained, incurred or been put to, by reason of the purchase made elsewhere or by reason of this contract having been so put an end to as aforesaid; and also all such difference in price, compensation, loss, cost damages, expenses and other moneys as shall for the time being be payable by the KELTRON as aforesaid.

13. In case any difference or dispute arises in connection with the contract, all legal proceedings relating to the matter shall be instituted in the Court within Thiruvananthapuram City.



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Hemalatha T.R.
Managing Director



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R. SREELEKHA IPS
TRANSPORT COMMISSIONER
KERALA

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- 14. In case, where KELTRON after having made partial supplies fails to fulfill the contract in full, all or any of the materials not supplied may at the discretion of the MVD, be purchased by means of another tender/quotation or by negotiation and the loss if any, caused to the MVD shall hereby together with such sums as may be fixed by the MVD towards damages be recovered from KELTRON as a debt due to MVD.
- 15. Every notice hereby required or authorized to be given may be either given to the KELTRON directly or left at the firm or last known place of abode or business or may be handed over to its agent personally or may be addressed to the KELTRON by post at its usual or last known place of abode or business and if so addressed and posted shall be deemed to have been sufficiently served on the KELTRON on the date on which in the ordinary course of mail a letter so addressed and posted would reach his place of abode or business. The KELTRON shall intimate the MVD any change in his place of business or address.
- 16. Jurisdiction: The validity and interpretation of this agreement shall be governed by the laws of India only. Courts located at Thiruvananthapuram in the State of Kerala alone shall have jurisdiction.
- 17. Resolution of Disputes: Any or all dispute between the parties will be settled amicably between the parties through mutual discussions by the signatories or their designated nominee. Failing amicable settlement, both parties agree to refer the dispute to the Secretary, Transport Department, Government Secretariat, Thiruvananthapuram.
- 18. Amendment: No amendments to this agreement shall be binding on either party except in writing signed by duly authorized representatives.



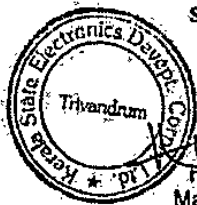
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Managing Director

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TRANSPORT COMMISSIONER
KERALA

19. Confidentiality: Each party shall maintain the confidentiality of any information it receives from the other party that has been designated as Confidential (Confidential Information) and shall use it only for the purpose of this agreement and not any private or commercial gain. This Confidentiality obligation shall not apply to information in which recipient party can prove in writing was at the time of disclosure.
- In the public domain
 - Lawfully in its possession and not acquired directly or indirectly from a third party under an obligation.
 - Furnished to the recipient without restriction by a third party having a bonafide right to do so
 - Public Knowledge by act or acts beyond the recipient's control or
 - Required to be disclosed by law or pursuant to a judicial order.
20. Status of assets on completion or termination of contract: All assets deployed at the office of the MVD by the KELTRON as per the proposal shall be at the disposal of the MVD and the same shall become the property of the MVD on completion or termination of the agreement.
21. Completion, testing, acceptance and delivery: The KELTRON shall make all reasonable endeavors to complete the project in accordance with the proposal. No variation shall be allowed in the proposal except under circumstance subject to mutual consent of the parties to the contract. On completion of the project, each of the sites shall be subjected to the test by the Technical Committee and after having certified the same satisfactorily it shall be deemed to have been accepted by the MVD. Each deliverable shall be accepted by the MVD on having successfully completed the acceptance procedure.
22. The agreement and annexures constitute the final and exclusive agreement between the parties with respect to subject under hereof and shall, cancel and supersede all prior or contemporaneous oral or written agreements, writings or



Hemalatha T R
Managing Director



R. SREELEKHA IPS
TRANSPORT COMMISSIONER
KERALA

communications in this regard. IN WITNESS WHEREOF the parties there-
undo have set their hands to these present on the day, month and year first
above mentioned.

(.....) for and on behalf of the
TRANSPORT COMMISSIONER, Trans Towers, Thiruvananthapuram.

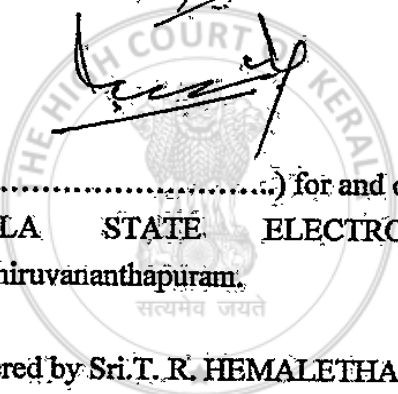
Signed, sealed and delivered by Sri. R. Sreelekha IPS

R. Sreelekha



In the presence of witnesses:

- 1. *Rajeev Puthalath*
- 2. *Shobin K S*



(.....) for and on behalf of the MANAGING
DIRECTOR, KERALA STATE ELECTRONICS DEVELOPMENT
CORPORATION Ltd, Thiruvananthapuram.

Signed, sealed and delivered by Sri. T. R. HEMALETHA

T. R. Hema

In the presence of witnesses:

- 1. *Geopakumari S.P*
- 2. *Bindu A.T.*

Geopakumari S.P
Bindu A.T.

Enclosures:-

Annexure 1 to 5

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123685/2020/INWARD TC

File No. TRANS-A2/258/2019-TRANS

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TRANSPORT COMMISSIONER
KERALA

FILED No.	
16	15
STATE OF KERALA	
TRANSPORT DEPARTMENT	
THIRUVANANTHAPURAM	



GOVERNMENT OF KERALA

Transport (A) Department

No. TRANS-A2/258/2019-TRANS

14/01/2020, Thiruvananthapuram

From
Principal Secretary to Government

To

- 1/ The Transport Commissioner,
Trans Towers, Vazhuthacaud, Thiruvananthapuram.
2. Director, Kerala State IT Mission (KSITM),
ICT Campus, Vellayambalam, Thiruvananthapuram - 695 033,
3. Regional Transport Officer (Nodal Officer for Safe Kerala Project)
Regional Transport Office, Civil Station, Alappuzha.

Sir,

Sub:- Transport Department - Evaluation and vetting of the project proposal for implementing 'Fully Automated Traffic Enforcement System' for 'Safe Kerala' project - Minutes of the Technical Committee meeting held on 28.12.2019 - Forwarding of - Reg.

Ref:- Government letter of even number dated 23.12.2019.

I am to forward herewith a copy of the minutes of the Technical Committee meeting held on 28.12.2019 for evaluation and vetting of the project proposal for implementing 'Fully Automated Traffic Enforcement System' for 'Safe Kerala' project for information and necessary action.

Yours faithfully,
MALATHY.S.

ADDITIONAL SECRETARY
For Principal Secretary to Government.

Approved for issue,

Section Officer,

Copy to :- PA to Principal Secretary (Transport)

123685/2020/INWARD TC

File No. TRANS-A2/258/2019-1 HANS

334/355

Minutes of the meeting of the Technical Committee held on 28.12.2019 in the chamber of the Principal Secretary (Transport) for evaluation and vetting of the project proposal for 'Fully automated traffic enforcement system' for 'Safe Kerala' project.

The meeting commenced at 11.40 am under the Chairmanship of Principal Secretary (Transport). The following officials attended the meeting

1. Smt. R. Sreelekha IPS, Transport Commissioner
2. Shri. Rajeev Puthalath, Joint Transport Commissioner
3. Shri. Santhosh Kumar, Senior Consultant, Kerala State IT Mission
4. Shri. Gopakumar, I.P., Head, (Commercial Division), Keltron
5. Shri. Shibu K. Itty, Nodal Officer, 'Safe Kerala' project

The Senior Consultant, KSITM pointed out that Keltron has prepared and forwarded project proposals for automated traffic enforcement system to both Police Department and the Motor Vehicle Department. Hence it should be ensured that the infrastructure to be developed under the project should not get duplicated by both the Departments to avoid wastage of infrastructure.

The Transport Commissioner clarified that traffic management is the duty of Police Department whereas traffic enforcement is solely being maintained by Motor Vehicle Department. Hence the purpose of automated systems implemented by these departments are different. Motor Vehicle Department is entitled to impose penalty for traffic violations including licence suspension, cancellation of licence etc. Since 'Safe Kerala' is the traffic enforcement programme exclusively being implemented by Motor Vehicle Department, the fully automated enforcement system proposed is highly essential for the effective implementation of the project. It is also pointed out that in other states, traffic management and traffic enforcement are being done by Police and the Motor Vehicle Departments separately.

The representative of Keltron has also pointed out that there is no duplication of infrastructure developed for Police Department and the Motor Vehicle Department

123685/2020/INWARD TC

File No. TRANS-A2/258/2019-TRANS

335/355

till now.

Principal Secretary (Transport) directed to ensure that cameras under the project are not installed in the same location by different agencies. For this, data sharing between Police Department and the Motor Vehicle Department is necessary. Motor Vehicle Department should identify the locations in which cameras are to be installed and share this data with Police Department so as to avoid wastage / overlapping of infrastructure. Principal Secretary also pointed out that a good number of cameras installed by different agencies as part of traffic management / enforcement are not working as observed in the review meeting held by the Hon'ble Chief Minister. Hence it should be monitored whether the cameras installed under this project are working. He also directed that the AMC for maintaining the cameras should be given for a period of 10 years.

The Principal Secretary asked whether the facilities of State Data Centre under Kerala State IT Mission can be made available to Motor Vehicle Department for collection of data from the new cameras. Representative of KSTTM informed that there are practical difficulties in accommodating data afresh under SDC. The Joint Transport Commissioner informed that the data centre under Vahan Sarathy can be used free of cost when linked to Vahan Sarathy.

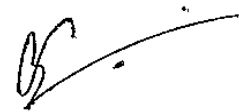
After detailed discussions, the Technical Committee approved the boot model of the proposal submitted by Motor Vehicle Department for implementing fully automated traffic enforcement system for 'Safe Kerala' project subject to certain conditions as mentioned below.

The meeting ended at 12:25 pm.

Decision of the Technical Committee

Approved the proposal submitted by Motor Vehicle Department for implementing 'Advanced' automated traffic enforcement system on boot model for 5 years and Facility Management Services for 5 years under 'Safe Kerala' Project, subject to the following Conditions

1. The Motor Vehicle Department should identify the exact location in which cameras are to be installed and share this data with Police Department to avoid duplication / wastage of infrastructure. It



123685/2020/INWARD TC

File No: TRANS-A2/258/2019-TRANS

336/356-

should be ensured that cameras are not installed in the same location by different agencies.

ii. The data collected through the cameras may be shared with Police Department on a need-based strategy.

iii. It should be frequently monitored to ensure whether the cameras installed under the project are working. AMC for maintaining the cameras should be given for an extended period of 10 years.



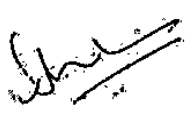
Shri. K.R. Jyothilal

Principal Secretary (Transport)



Smt. R. Sreelekha

Transport Commissioner



Shri. Santhosh Kumar

Sr. Consultant, KSITM



Shri. Shibu.K.Ity

Nodal Officer (Safe Kerala)



123685/2020/INWARD TC

File No. TRANS-A2/258/2019-TRANS

355/355



GOVERNMENT OF KERALA

Transport (A) Department

No. TRANS-A2/258/2019-TRANS

14/01/2020, Thiruvananthapuram

From

Principal Secretary to Government

To

1. The Transport Commissioner,
Trans Towers, Vazhuthacaud, Thiruvananthapuram.
2. Director, Kerala State IT Mission (KSITM),
ICT Campus, Vellayambalam, Thiruvananthapuram - 695 033.
3. Regional Transport Officer (Nodal Officer for Safe Kerala Project)
Regional Transport Office, Civil Station, Alappuzha.

Sir,

Sub:- Transport Department - Evaluation and vetting of the project proposal for implementing 'Fully Automated Traffic Enforcement System' for 'Safe Kerala' project - Minutes of the Technical Committee meeting held on 28.12.2019 - Forwarding of- Reg.

Ref:- Government letter of even number dated 23.12.2019.

I am to forward herewith a copy of the minutes of the Technical Committee meeting held on 28.12.2019, for evaluation and vetting of the project proposal for implementing 'Fully Automated Traffic Enforcement System' for 'Safe Kerala' project, for information and necessary action.

Yours faithfully,
MALATHY.S.

ADDITIONAL SECRETARY
For Principal Secretary to Government.

Approved for issue,

Section Officer.

Copy to :- PA to Principal Secretary (Transport)

123685/2020/INWARD TC

File No.TRANS-A2/258/2019-1TRANS

334/355

Minutes of the meeting of the Technical Committee held on 28.12.2019 in the chamber of the Principal Secretary (Transport) for evaluation and vetting of the project proposal for 'Fully automated traffic enforcement system' for 'Safe Kerala' project

The meeting commenced at 11.40 am under the Chairmanship of Principal Secretary (Transport). The following officials attended the meeting

1. Smt. R. Sreelekha IPS, Transport Commissioner
2. Shri. Rajeev Puthalath, Joint Transport Commissioner
3. Shri. Santhosh Kumar, Senior Consultant, Kerala State IT Mission
4. Shri. Gopakumar.I.P, Head (Commercial Division), Keltron
5. Shri. Shibu.K.Itty, Nodal Officer, 'Safe Kerala' project

The Senior Consultant, KSITM pointed out that Keltron has prepared and forwarded project proposals for automated traffic enforcement system to both Police Department and the Motor Vehicle Department. Hence it should be ensured that the infrastructure to be developed under the project should not get duplicated by both the Departments to avoid wastage of infrastructure.

The Transport Commissioner clarified that traffic management is the duty of Police Department whereas traffic enforcement is solely being maintained by Motor Vehicle Department. Hence the purpose of automated systems implemented by these departments are different. Motor Vehicle Department is entitled to impose penalty for traffic violations including licence suspension, cancellation of licence etc. Since 'Safe Kerala' is the traffic enforcement programme exclusively being implemented by Motor Vehicle Department, the fully automated enforcement system proposed is highly essential for the effective implementation of the project. It is also pointed out that in other states, traffic management and traffic enforcement are being done by Police and the Motor Vehicle Departments separately.

The representative of Keltron has also pointed out that there is no duplication of infrastructure developed for Police Department and the Motor Vehicle Department



File No.TRANS-A2/258/2019-TRANS

**GOVERNMENT OF KERALA****Abstract**

Transport Department - Safe Kerala Project - Advanced automated traffic enforcement system - Administrative Sanction accorded - Orders issued.

TRANSPORT (A) DEPARTMENT

G.O.(Rt)No.134/2020/TRANS Dated,Thiruvananthapuram, 27/04/2020

Read 1 Letter dated 17.06.2019 submitted by the Nodal Officer, Safe Kerala Project.

2 Letter No.E1/37/2019 dated 12.07.2019, 25.07.2019 and 25.10.2019 from the Transport Commissioner.

3 G.O.(Rt) No. 559/2019/Trans dated 17.12.2019.

ORDER

The Transport Commissioner has forwarded a proposal for Fully Automated Traffic Enforcement System for Safe Kerala to ensure a constant high profile presence and cohesive enforcement protocols. The detailed proposal for Fully Automated Traffic Enforcement System for Safe Kerala Project submitted by KELTRON was evaluated by the technical committee constituted as per Government Order read as 3rd paper above.

2. Administrative Sanction is accorded for implementing Fully Automated Traffic Enforcement System on boot model for five years and Facility Management Services for five years under Safe Kerala Project subject to the following conditions:

1. KELTRON may act as a PMC and a vendor be chosen through a transparent bidding process.

2. KELTRON to detect vehicles violating traffic rules. Transport Commissioner must ensure that there is no overlap with the cameras of State Police Chief.

File No.TRANS-A2/258/2019-TRANS

3. The Technical Committee should monitor the implementation of the project at each and every stage of its implementation.

4. The Motor Vehicles Department should execute a Service Level Agreement (SLA) with KELTRON for implementation of the project and the conditions put forth by the Technical Committee in its meeting held on 28.12.2019 should be incorporated in the SLA.

(By order of the Governor)

KR JYOTHILAL
PRINCIPAL SECRETARY

The Transport Commissioner, Thiruvananthapuram.

The Road Safety Commissioner, Kerala Road Safety Authority,
Thiruvananthapuram.

The Director, Kerala State IT Mission (KSITM), Vellayambalam,
Thiruvananthapuram.

The Head, State e-Governance Mission Team, Uppalam Road, Statue,
Thiruvananthapuram.

The Nodal Officer, 'Safe Kerala' project (through Transport
Commissioner)

The Principal Accountant General (Audit/A&E), Kerala,
Thiruvananthapuram.

Finance Department.

Electronics & Information Technology (IT Cell) Department

Information & Public Relations (Web & New Media) Department

(For publishing in the official website).

Stock file / Office copy

Copy to:- P.S. to Minister (Transport)

P.A. to Principal Secretary (Transport)

Forwarded /By order

Section Officer

File No.E1/37/2019-TC

E1/37/2019/TC

Transport Commissionerate,
Thiruvananthapuram
Dated: 14/05/2020

From

The Transport Commissioner, Kerala

To

The Managing Director,
Kerala State Electronics Development Corporation Ltd.,
Keltron Communication Group,
Keltron Communication Complex,
Monvila, Kulathur P.O
Trivandrum 695583

Sir,

Sub: - Motor Vehicles Department – Safe Kerala Project – Advanced Automated Traffic Enforcement System – Setting up of entire infrastructure and Facility Management Services – Work Order – issued – reg.

- Ref: - 1. G.O. (Rt) No. 42/2018/Trans dated 04/06/2018 and G.O. (Rt) No. 44/2018/Trans dated 16/06/2018
2. Proposal no. KCC/SEU/G36/IT/2019-20 dated 22/08/2019 from KELTRON.
3. This office letter of even no. dated 25/10/2019.
4. G.O. (Rt) No. 134/2020/Trans dated 27/04/2020
5. G.O. (Rt) No. 559/2019/Trans dated 17/12/2019
6. Minutes of the meeting of the Technical Committee held on 28/12/2019

As per reference 1st cited, Government had accorded Administrative Sanction to set up a Safe Kerala Project with an aim to reduce road accidents and efficient enforcement of traffic rules. Keltron vide reference 2nd cited had submitted a detailed commercial and technical proposal for setting up the Fully Automated Traffic enforcement Systems, Control rooms, infrastructure and Facility Management Services related to Safe Kerala for a period of five years on BOOT model. Vide reference 3rd cited, Government was requested to accord Administrative Sanction to entrust Keltron for implementation of the project and vide reference 4th cited, Government had accorded Administrative Sanction to entrust the implementation of the project with Keltron on BOOT (Built Operate Own Transfer) model for five years and Facility Management Services for five years subject to the conditions specified in the Government Order G.O. (Rt) No. 134/2020/Trans dated 27/04/2020.

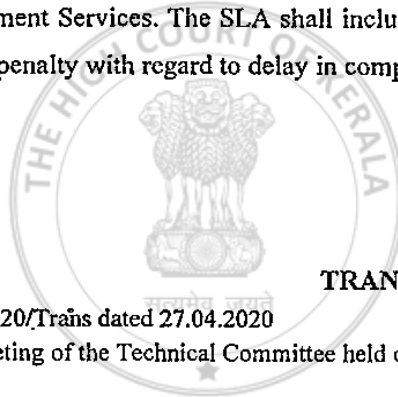
Hence, Work Order is issued to KELTRON for setting up the entire infrastructure including required civil work and five year Warranty service on BOOT model for a period



File No.E1/37/2019-TC

of five years at a total cost of Rs. 1,68,90,26,124/- (Rupees One Hundred and sixty eight Crores Ninety Lakhs Twenty Six Thousand One Hundred and Twenty Four only) inclusive of all taxes and Facility Management Services for five years at a total cost of Rs. 66,92,02,688/- (Rupees Sixty Six Crores Ninety Two Lakhs Two Thousand Six Hundred and Eighty Eight only) inclusive of all taxes.

1. KELTRON shall adhere to all the works, deliverables, project components and payment terms as is specified in the proposal submitted vide reference 2nd cited and the decisions of the Technical Committee vide reference 6th cited.
2. KELTRON may act as a PMC and a vendor be choosen through a transparent bidding process
3. KELTRON shall submit separate draft Service Level Agreement (SLA) within two weeks on receipt of this work order with regard to implementation of BOOT model and Facility Management Services. The SLA shall include in detail the terms relating to the downtime and penalty with regard to delay in completion and other works.



Signature of

Digitally signed by R
SREELEKHA
Date: 2020.05.14
12:25:37 +05'30'R. SREELEKHA IPS
TRANSPORT COMMISSIONER

Encl: (i) G.O(Rt)No. 134/2020/Trans dated 27.04.2020
(ii) Minutes of the meeting of the Technical Committee held on
28/12/2019

INDEX

Procurement Details For Safe Kerala Project

Sl No	Description	Invoice value (In Rs)	Page No
1	Value Of Items Procured From SRIT Through E-Tender	1,28,15,85,545.90	4-6
2	Value Of Other Items Procured Through E-Tender	2,15,90,803.61	6-9
3	Value of Items Procured Through Sealed Quotation	74,49,435.47	10-11
4	Value of Items Procured Through E-Mail Quotation	1,27,25,844.50	12-19
5	Value of Items Procured Through Cash Purchase	68,011.36	20-21
6	Value Of Production Of Enforcement System By Keltron	1,47,55,694.00	22
7	Details Of Amount Release To NHAI, KRFB	3,18,455.00	23
Total Invoice value		1,33,84,93,789.84	

E-TENDER DETAILS FOR SAFE KERALA PROJECT

Summary

Sl No	Tender Title	E - Tender Reference Number	Tender ID	Pre-Qualified Bidder's Name	Name of L1 Bidder	Purchase order Number	Total Invoice Value (In Rs)
1	The Supply of different electronics modules, AIC modules, ANPRC modules, Vehicles for Mobile enforcement system, Supply Installation and commissioning of CCR , DCRs, field installation including street furniture, Software and Software Licenses on 5 year BOOT model with 5 year Warranty	KSEDC/KCC/CPG/ENQ/0041/20-21 Dtd 26-06-2020	2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED ASHOKA BUILD CORN LTD AKSHARA ENTERPRISES INDIA PRIVATE LIMITED	SRIT INDIA PRIVATE LIMITED	KCC/PO/CPG/T/0273/20-21	1281585546
2	Supply of SSD Hard Disc	KSEDC/KCC/PUR/ENQ/0070/20-21 Dtd 18-07-2020	2020_KSEDC_372460_1	RASHI PERIPHERALS PVT. LTD. EME	RASHI PERIPHERALS PVT. LTD.	KCC/PO/CPG/M/0123/20-21	3194825
3	Supply of 40 AH, 42AH & 80AH Battery & Charging Unit	KSEDC/KCC/PUR/ENQ/0088(1)/20-21 Dtd 20-11-2020	2020_KSEDC_399757_3	HYKON INDIA LTD	HYKON INDIA LTD	KCC/PO/CPG/M/0440/20-21	3641550

Sl No	Tender Title	E - Tender Reference Number	Tender ID	Pre-Qualified Bidder's Name	Name of L1 Bidder	Purchase order Number	Total Invoice Value (In Rs)
4	Supply of Cables	KSEDC/KCC/PUR/ENQ/0057/20-21 Dtd 21-07-2020	2020_KSEDC_372815_4	TRANSWAVES EQUIPMENTS PRIVATE LIMITED	ELECTRONIC CABLE CENTRE	KCC/PO/CPG/M/0218/20-21	502583.8
				RANGE ENTERPRISES			
				ELECTRONIC CABLE CENTRE			
5	Supply of Cables	KSEDC/KCC/PUR/ENQ/0057/20-21 Dtd 21-07-2020	2020_KSEDC_372815_4	TRANSWAVES EQUIPMENTS PRIVATE LIMITED	RANGE ENTERPRISES	KCC/PO/CPG/M/0219/20-21	133848.21
				RANGE ENTERPRISES			
				ELECTRONIC CABLE CENTRE			
6	Supply of Connectors	KSEDC/KCC/PUR/ENQ/0063/20-21 Dtd 13-07-2020	2020_KSEDC_371535_2	AMAR RADIO CORPORATION	BHAVYA IMPEX PVT. LTD.	KCC/PO/CPG/M/0254/20-21	2210501.3
				BHAVYA IMPEX PVT. LTD.			
7	Supply of Connectors	KSEDC/KCC/PUR/ENQ/0063/20-21 Dtd 13-07-2020	2020_KSEDC_371535_2	AMAR RADIO CORPORATION	AMAR RADIO CORPORATION	KCC/PO/CPG/M/0255/20-21	29295.3
				BHAVYA IMPEX PVT. LTD.			

Sl No	Tender Title	E - Tender Reference Number	Tender ID	Pre-Qualified Bidder's Name	Name of L1 Bidder	Purchase order Number	Total Invoice Value (In Rs)
8	Supply of VPP – 150W Solar Panel	KSEDC/KCC/PUR/ENQ/0122/20-21 Dtd 12-01-2021	2021_KSEDC_405660_2	HYKON INDIA LTD.	HYKON INDIA LTD.	KCC/PO/CPG/M/0541/20-21	7578200
				SINELAB TECHNOLOGY PVT LTD			
				SOLGEN ENERGY PVT LTD			
9	Supply of LiFePo4, 12V 80 AH Battery	KSEDC/KCC/PUR/ADV/045/21-22 Dtd 04-02-2022	2022_KSEDC_472526_1	HYKON INDIA LTD.	HYKON INDIA LTD.	KCC/PO/CPG/T/0272/21-22	3000000
10	Supply of LiFePo4, 12V 80 AH Battery	KSEDC/KCC/PUR/ADV/045/21-22 Dtd 04-02-2022	2022_KSEDC_472526_1	HYKON INDIA LTD.	HYKON INDIA LTD.	KCC/PO/CPG/T/0319/21-22	1300000

Value of Items Procured Through E-Tender

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
1	KCC/PO/CPG/T/0273/20-21	KL/SRIT/03/21/31 31.03.2021	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	37,25,21,476.03
2		KL/SRIT/03/22/11 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	61,29,837.00
3		KL/SRIT/03/22/12 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	20,43,279.00
4		KL/SRIT/03/22/13 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	34,90,100.00
5		KL/SRIT/03/22/14 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	5,62,25,360.00
6		KL/SRIT/03/22/15 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	6,54,18,060.00
7		KL/SRIT/03/22/16 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	1,52,21,750.00
8		KL/SRIT/03/22/17 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	59648670
9		KL/SRIT/03/22/18 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	1,15,54,160.00
10		KL/SRIT/03/22/19 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	1,73,31,240.00
11		KL/SRIT/03/22/20 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	30,44,350.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
12		KL/SRIT/03/22/21 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	2,06,81,175.00
13		KL/SRIT/03/22/22 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	91,33,050.00
14		KL/SRIT/03/22/23 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	1,36,99,575.00
15		KL/SRIT/03/22/25 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	2,51,02,871.00
16		KL/SRIT/03/22/24 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	1,96,46,370.00
17		KL/SRIT/03/22/26 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	1,57,62,755.00
18		KL/SRIT/03/22/27 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	5,17,67,280.00
19		KL/SRIT/03/22/28 28.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	2,22,85,816.00
20		KL/SRIT/03/22/31 29.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	99,77,070.00
21		KL/SRIT/03/22/32 29.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	2,72,04,862.00
22		KL/SRIT/03/22/33 29.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	4,01,30,840.00
23		KL/SRIT/03/22/34 29.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	44,43,192.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
24		KL/SRIT/03/22/35 29.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	83,92,464.00
25		KL/SRIT/03/22/36 29.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	12,00,000.00
26		KL/SRIT/03/22/37 29.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	3,19,81,750.00
27		KL/SRIT/03/22/38 29.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	8,03,21,314.00
28		KL/SRIT/03/22/41 30.03.2022	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	4,61,670.00
29		KL/SRIT/11/21/01 08.11.2021	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	8,27,83,950.00
30		KL/SRIT/12/21/15 28.12.2021	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	4,77,51,209.87
31		KL/SRIT/12/21/16 28.12.2021	E-tender/ Tender ID 2020_KSEDC_368203_1	SRIT INDIA PRIVATE LIMITED	15,62,30,050.00
Total Invoice Value of SRIT INDIA PRIVATE LIMITED for PO No. KCC/PO/CPG/T/0273/20-21					Rs.1,28,15,85,545.90
32	KCC/PO/CPG/M/0123/20-21	S3200096032 05.12.2020	E-tender / Tender Id 2020_KSEDC_372460_1	RASHI PERIPHERALS PVT. LTD.	11,82,500.00
33		S3200095260 28.11.2020	E-tender / Tender Id 2020_KSEDC_372460_1	RASHI PERIPHERALS PVT. LTD.	20,12,325.00
34	KCC/PO/CPG/M/0440/20-21	OLG-B 2122000157 20.04.2021	E-tender/ Tender ID 2020_KSEDC_399757_3	HYKON INDIA LTD.	19,34,900.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
35		OLG-B/2122000986 19.06.2021	E-tender/ Tender ID 2020_KSEDC_399757_3	HYKON INDIA LTD.	17,06,650.00
36	KCC/PO/CPG/M/0218/20-21	ECC//3939/T/20 13.01.2021	E-tender/ Tender ID 2020_KSEDC_372815_4	ELECTRONIC CABLE CENTRE	2,64,683.80
37		ECC/3649/T/20 23.12.2020	E-tender/ Tender ID 2020_KSEDC_372815_4	ELECTRONIC CABLE CENTRE	2,37,900.00
38	KCC/PO/CPG/M/0219/20-21	551/2020-21 16.11.2020	E-tender/ Tender ID 2020_KSEDC_372815_4	RANGE ENTERPRISES	92,588.45
39		584/2020-21 27.11.2020	E-tender/ Tender ID 2020_KSEDC_372815_4	RANGE ENTERPRISES	35,490.00
40		620/2020-21 10.12.2020,	E-tender/ Tender ID 2020_KSEDC_372815_4	RANGE ENTERPRISES	5,769.76
41		3303201 15.01.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	17,861.37
42		3304027 03.05.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	74,175.00
43		3303168 08.12.2020	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	1,43,997.03
44		3303186 30.12.2020	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	1,97,034.61
45		3304022 26.04.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	4,22,500.80
46		3303176 22.12.2020	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	32,840.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
47	KCC/PO/CPG/M/0254/20-21	3303191 05.01.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	42,514.86
48		3303197 14.01.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	44,974.78
49		3303207 25.01.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	15,032.80
50		3303231 19.02.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	2,20,136.57
51		3303240 24.02.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	6,848.83
52		3303245 01.03.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	855.97
53		3303282 22.03.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	88,070.45
54		3304031 24.05.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	5,90,442.00
55		3304034 27.05.2021	E-tender/ Tender ID 2020_KSEDC_371535_2	BHAVYA IMPEX PVT. LTD.	3,13,315.20
56		KCC/PO/CPG/M/0255/20-21	GSI-2021-11466 10.12.2020,	E-tender/ Tender ID 2020_KSEDC_371535_2	AMAR RADIO CORPORATION
57	GSI-2021-14108 22.01.2021		E-tender/ Tender ID 2020_KSEDC_371535_2	AMAR RADIO CORPORATION	15,750.00
58		OLG-B / 2122000379 28.04.2021	E-tender / Tender Id 2021_KSEDC_405660_2	HYKON INDIA LTD.	38,23,560.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
59	KCC/PO/CPG/M/0541/20-21	OLG-B/2122001099 23.06.2021	E-tender / Tender Id 2021_KSEDC_405660_2	HYKON INDIA LTD.	33,56,730.00
60		OLG-B/2122001118 24.06.2021	E-tender / Tender Id 2021_KSEDC_405660_2	HYKON INDIA LTD.	3,77,910.00
61		3389	E-tender / Tender Id 2021_KSEDC_405660_2	HYKON INDIA LTD.	20,000.00
62	KCC/PO/CPG/T/0272/21-22	OLG-B/2122006135	E-tender / Tender Id 2022_KSEDC_472526_1	HYKON INDIA LTD.	10,00,000.00
63		OLG-B/2122006190	E-tender / Tender Id 2022_KSEDC_472526_1	HYKON INDIA LTD.	6,00,000.00
64		OLG-B/2122006242	E-tender / Tender Id 2022_KSEDC_472526_1	HYKON INDIA LTD.	8,00,000.00
65		OLG-B/2122006331	E-tender / Tender Id 2022_KSEDC_472526_1	HYKON INDIA LTD.	6,00,000.00
66	KCC/PO/CPG/T/0319/21-22	OLG-B/2122006332	E-tender / Tender Id 2022_KSEDC_472526_1	HYKON INDIA LTD.	2,00,000.00
67		OLG-B/2122006380	E-tender / Tender Id 2022_KSEDC_472526_1	HYKON INDIA LTD.	6,00,000.00
68		OLG-B/2122006440	E-tender / Tender Id 2022_KSEDC_472526_1	HYKON INDIA LTD.	5,00,000.00
Total Procured value for SSD Storage Hard Disc,40 Ah,42AH&80Ah Life PO4 Battery &Charging Unit,Cables,Military Connectors and VPP-150W Solar Panel					Rs.2,15,90,803.61/-

Value of Items Procured Through Sealed Quotation

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
1	KCC/PO/CPG/M/0079/20-21	DM1011763146, 19-09-2020	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	3,63,859.38
2	KCC/PO/CPG/M/0347/20-21	089 05-08-2021,	Sealed Quotation	AERON ENGINEERING	1,68,000.00
3		168 21.10.2021	Sealed Quotation	AERON ENGINEERING	56,000.00
4		251 31.12.2021	Sealed Quotation	AERON ENGINEERING	56,000.00
5		296 14.2.2022	Sealed Quotation	AERON ENGINEERING	56,000.00
6		331 15.03.2022	Sealed Quotation	AERON ENGINEERING	33,600.00
7		335 18.03.2022	Sealed Quotation	AERON ENGINEERING	14,000.00
8		339 21.03.2022	Sealed Quotation	AERON ENGINEERING	36,960.00
9		KCC/PO/CPG/M/0189/20-21	587 15.12.2020	Sealed Quotation	CHETAN CABLETRONICS (P) LTD
10	KCC/PO/CPG/M/0253/20-21	DM1011767322 16.12.2020	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	8,65,064.25
11		DM1011767346 17.12.2020	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	7,30,185.75
12		DM1011768073 30.12.2020	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	4,32,635.50
13		DM1011768101 30.12.2020	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	4,47,622.00
14		DM1011768102 30.12.2020	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	14,986.50
15		DM1011768128 31.12.2020,	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	4,17,649.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)	
16		DM1011768141 31.12.2020	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	3,50,209.75	
17		DM1011768142 31.12.2020,	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	1,34,878.50	
18		DM1011768550 11.01.2021	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	7,493.21	
19		FO1012021857 12.03.2021	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	5,900.00	
20		DM1011770416 15.02.2021	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	4,36,810.13	
21		DM1011770419 16.02.2021	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	5,34,068.98	
22	KCC/PO/CPG/M/0322/20-21	DM1011770428 16.02.2021	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	5,34,068.99	
23		DM1011770452 16.02.2021	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	3,80,321.86	
24		DM1011770697 20.02.2021	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	3,80,321.85	
25		DM1011770698 20.02.2021	Sealed Quotation	RITTAL INDIA PRIVATE LIMITED	32,367.82	
26		KCC/PO/CPG/M/0031/21-22	R 1994 11.06.2021	Sealed Quotation	SOURCE TECHNOLOGI	3,64,353.00
Total Invoice Value Procured Through Sealed Quotation					Rs.74,49,435.47/-	

Value of Items Procured Through Email Quotation

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
1	KCC/PO/CPG/M/0157/20-21	ECC/3276/T/20 01.12.2020	Email Quotation	ELECTRONIC CABLE CENTRE	9,582.00
2	KCC/PO/CPG/M/0183/20-21	NSD/593 16.11.2020	Email Quotation	NAVABHARATH SYSTEMS AND DEVICES (P) LTD.	18,424.00
3	KCC/PO/CPG/M/0285/20-21	PSI-2021-13266 09.12.2020	Email Quotation	RS COMPONENTS & CONTROLS (INDIA) LTD.	9,750.00
4	KCC/PO/CPG/M/0350/20-21	3303244 01.03.2021	Email Quotation	BHAVYA IMPEX PVT. LTD.	3,017.00
5		3304017 16.04.2021	Email Quotation	BHAVYA IMPEX PVT. LTD.	1,35,953.00
6	KCC/PO/CPG/I/0130/20-21	INVLT202096 21.10.2020	Email Quotation	LON TREND CORPORATION	3,38,791.00
7		Debit Advice dt 14.10.2020	Email Quotation	Banking Charges	3,345.00
8		IG051220100936240025	Email Quotation	Customs duty	1,49,692.00
9		COKINOI202100015 01/12/2020	Email Quotation	Balmer Lawrie & Co LTD	51,494.00
10		COKINOI202100021 18/12/2020	Email Quotation	Balmer Lawrie & Co LTD	4,527.11
11		689/IMP/20-21 15.12.2020	Email Quotation	PH Value Shipping Private LTD	9,500.00
12	KCC/PO/CPG/M/0351/20-21	C/0009643/20-21 29.01.2021	Email Quotation	SPECTRA CONNECTRONICS LLP	1,77,747.00
13	KCC/PO/CPG/M/0158/20-21	CES-201102 27.11.2020	Email Quotation	CYMATICS ELECTRICAL SOLUTIONS	4,773.34

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
14	KCC/PO/CPG/M/0199/20-21	B2B/358/21-22 22.04.2021,	Email Quotation	TRANS WAVES EQUIPMENTS PVT. LTD.	5,940.00
15		B2B/485/21-22 30.04.2021	Email Quotation	TRANS WAVES EQUIPMENTS PVT. LTD.	3,240.00
16	KCC/PO/CPG/M/0287/20-21	GSI-2021-13077 05.01.2021	Email Quotation	AMAR RADIO CORPORATION	7,908.00
17	KCC/PO/CPG/M/0286/20-21	3303198 14.01.2021	Email Quotation	BHAVYA IMPEX PVT. LTD.	17,691.00
18	KCC/PO/CPG/M/0290/20-21	560779 08.02.2021	Email Quotation	ELEMENT 14 INDIA PVT. LTD.	1,518.60
19	KCC/PO/CPG/I/0195/20-21	PI-20200918201 23.11.2020	Email Quotation	CHAINS TECHNOLOGY CO. LTD.	18,30,864.00
20		IG270121120051866997	Email Quotation	Customs duty	7,50,268.00
21		1025/IMP/20-21	Email Quotation	PH Value Shipping Private LTD	12,500.00
22		COKINOI202100022 19/01/2021	Email Quotation	Balmer Lawrie & Co LTD	30,400.00
23		COKINOI202100026 9/02/2021	Email Quotation	Balmer Lawrie & Co LTD	18,352.00
24		COKINOI202100028 29/02/2021	Email Quotation	Balmer Lawrie & Co LTD	3,500.00
25		COKINOI202100032 26/02/2021	Email Quotation	Balmer Lawrie & Co LTD	2,543.48
26		KCC/PO/CPG/M/0250/20-21	3303174 21.12.2020	Email Quotation	BHAVYA IMPEX PVT. LTD.
27	3303188 01.01.2021		Email Quotation	BHAVYA IMPEX PVT. LTD.	34,703.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
28		3303279 20.03.2021	Email Quotation	BHAVYA IMPEX PVT. LTD.	2,61,483.00
29	KCC/PO/CPG/M/0349/20-21	ECC/4686/T/20 16.03.2021	Email Quotation	ELECTRONIC CABLE CENTRE	5,760.00
30	KCC/PO/CPG/M/0310/20-21	1008 29.01.2021	Email Quotation	KUBHERA CABLE PVT. LTD	16,866.00
31	KCC/PO/CPG/M/0125/20-21	ECC/3275/T/20 01.12.2020	Email Quotation	ELECTRONIC CABLE CENTRE	35,750.00
32	KCC/PO/CPG/M/0099/20-21	B/01588/20-21 25.08.0020	Email Quotation	TRANS WAVES EQUIPMENTS PVT. LTD.	9,650.00
33	KCC/PO/CPG/M/0135/20-21	T-1208 27.11.2020	Email Quotation	IOTA INTERNATIONAL	1,28,545.00
34	KCC/PO/CPG/M/0137/20-21	Q5632 14.10.2020	Email Quotation	SOURCE TECHNOLOGI	19,530.42
35	KCC/PO/CPG/M/0138/20-21	3303125 09.10.2020	Email Quotation	BHAVYA IMPEX PVT. LTD.	15,140.00
36	KCC/PO/CPG/M/0215/20-21	570 02.11.2020	Email Quotation	FASTENERS & INDUSTRIAL COMPONENTS	15,776.50
37	KCC/PO/CPG/M/0141/20-21	G-9689 28.09.2020	Email Quotation	UK AGENCIES & ELECTRICALS	71,389.84
38	KCC/PO/CPG/M/0126/20-21	CES-201101 27.11.2020	Email Quotation	CYMATICS ELECTRICAL SOLUTIONS	7,723.50
39	KCC/PO/CPG/M/0511/20-21	C/0000329/21-22 14.04.2021	Email Quotation	SPECTRA CONNECTRONICS LLP	1,08,250.00
40	KCC/PO/CPG/M/0385/20-21	C/0008485/20-21 06.01.2021	Email Quotation	SPECTRA CONNECTRONICS LLP	44,835.00
41	KCC/PO/CPG/M/0497/20-21	033 21.06.2021	Email Quotation	AERON ENGINEERING	18,400.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
42	KCC/PO/CPG/M/0498/20-21	NSD/121 15.07.2021	Email Quotation	NAVABHARATH SYSTEMS AND DEVICES (P) LTD.	93,840.00
43	KCC/PO/CPG/M/0432/20-21	2136 05.03.2021	Email Quotation	UNITED ELECTRICALS	58,265.00
44	KCC/PO/CPG/M/0162/20-21	323-B-2021-00423 19.10.2020	Email Quotation	NICE CHEMICALS PVT .LTD,	37,000.00
45	KCC/PO/CPG/M/0174/20-21	G 127 08.10.2020	Email Quotation	BRITE PAINTS & HARDWARES	2,127.53
46	KCC/PO/CPG/M/0494/20-21	0220 08.06.2021	Email Quotation	KUBHERA CABLE PVT. LTD	3,920.00
47	KCC/PO/CPG/M/0216/20-21	102-20-21 20.11.2020,	Email Quotation	CINCO TECH	26,887.00
48		65-20-21 23.10.2020	Email Quotation	CINCO TECH	4,395.00
49	KCC/PO/CPG/M/0217/20-21	PSI-2021-10478 31.10.2020	Email Quotation	RS COMPONENTS & CONTROLS (INDIA) LTD.	5,916.80
50	KCC/PO/CPG/M/0113/21-22	GB000457 17.08.2021	Email Quotation	UMA PAINTS	38,262.00
51	KCC/PO/CPG/M/0172/20-21	441, 17-10-2021	Email Quotation	KHANNA TRADERS & ENGINEERS	22,400.00
52	KCC/PO/CPG/M/0299/20-21	ST -418/20-21 09.02.2021	Email Quotation	STAMPTEK TOOLINGS (I) PVT. LTD	6,075.00
53	KCC/PO/CPG/M/0311/20-21	NSD/740 02.02.2021	Email Quotation	NAVABHARATH SYSTEMS AND DEVICES (P) LTD.	16,849.00
54	KCC/PO/CPG/M/0185/20-21	PC20002545 04.01.2021	Email Quotation	PROCON CONTROLS	51,480.00
55	KCC/PO/CPG/M/0177/20-21	NXM/20-21/638 15.02.2021	Email Quotation	NXM INDIA PVT. LTD.	1,24,950.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (Without Tax)(RS)
56	KCC/PO/CPG/M/0170/20-21	5809 07.10.2020	Email Quotation	NIPPON INDIA	49,807.00
57	KCC/PO/CPG/M/0173/20-21	0831 16.10.2020	Email Quotation	HYBRID METALS PVT. LTD.,	5,000.00
58	KCC/PO/CPG/M/0360/20-21	UETL/2021/1263 22.01.2021	Email Quotation	UNIFIED ELECTRO-TECH PVT. LTD.	21,585.00
59		UETL/2021/1613 24.03.2021	Email Quotation	UNIFIED ELECTRO-TECH PVT. LTD.	2,909.00
60	KCC/PO/CPG/M/0361/20-21	C/0008486/20-21 06.01.2021	Email Quotation	SPECTRA CONNECTRONICS LLP	2,617.50
61	KCC/PO/CPG/M/0437/20-21	NSD/122 15.07.2021	Email Quotation	NAVABHARATH SYSTEMS AND DEVICES (P) LTD.	1,73,420.00
62		NSD/670 31.12.2020	Email Quotation	NAVABHARATH SYSTEMS AND DEVICES (P) LTD.	920.00
63		NSD/852 17.03.2021	Email Quotation	NAVABHARATH SYSTEMS AND DEVICES (P) LTD.	69,920.00
64		NSD/888 29.03.2021	Email Quotation	NAVABHARATH SYSTEMS AND DEVICES (P) LTD.	1,01,200.00
65	KCC/PO/CPG/M/0071/21-22	22/004989 29.07.2021	Email Quotation	AGARWAL FASTNERS PVT. LTD.	16,322.00
66	KCC/PO/CPG/M/0072/21-22	L-1750 09.07.2021	Email Quotation	LAKSHMI ELECTRICALS	99,890.00
67	KCC/PO/CPG/M/0091/21-22	R21IN016150 30.08.2021	Email Quotation	WURTH ELECTRONICS SERVICES INDIA PVT LTD	24,900.00
68	KCC/PO/CPG/M/0090/21-22	ECC/1286/T/21 02.08.2021	Email Quotation	ELECTRONIC CABLE CENTRE	2,200.00
69	KCC/PO/CPG/M/0073/21-22	PG 458 27.07.2021	Email Quotation	PREMAC GRAPHICS	19,735.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
70	KCC/PO/CPG/M/0105/21-22	OLG-B/2122002700 18.09.2021	Email Quotation	HYKON INDIA LTD.	6,000.00
71	KCC/PO/CPG/M/0100/21-22	220429 09.08.2021	Email Quotation	KEC, Karakulam	8,87,500.00
72		220651 06.10.2021	Email Quotation	KEC, Karakulam	8,87,500.00
73		220842 30.11.2021	Email Quotation	KEC, Karakulam	7,98,750.00
74		221223 16.02.2022	Email Quotation	KEC, Karakulam	7,45,500.00
75		221251 23.02.2022	Email Quotation	KEC, Karakulam	2,30,750.00
76		221287 26.02.2022	Email Quotation	KEC, Karakulam	3,55,000.00
77		221370 07.03.2022	Email Quotation	KEC, Karakulam	4,43,750.00
78		221385 09.03.2022	Email Quotation	KEC, Karakulam	53,250.00
79		221414 17.03.2022	Email Quotation	KEC, Karakulam	3,90,500.00
80		221477 21.03.2022	Email Quotation	KEC, Karakulam	4,43,750.00
81		221490 24.03.2022	Email Quotation	KEC, Karakulam	88,750.00
82	KCC/PO/CPG/M/0020/21-22	595134 16.06.2021	Email Quotation	ELEMENT 14 INDIA PVT. LTD.	1,15,920.00
83	KCC/PO/CPG/M/0037/21-22	52, 29-07-2021	Email Quotation	CYBRON MANUFACTURING SOLUTIONS	12,600.00

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
84	KCC/PO/CPG/M/0070/21-22	PSI-2122-08316 05.07.2021	Email Quotation	RS COMPONENTS & CONTROLS (INDIA) LTD.	3,237.60
85	KCC/PO/CPG/M/0118/21-22	220448 19.08.2021	Email Quotation	KEC, Karakulam	35,000.00
86	KCC/PO/CPG/M/0078/21-22	WT276 30.07.2021	Email Quotation	WHITENESS	84,000.00
87	KCC/PO/CPG/I/0033/21-22	CH210609KE 09.06.2021	Email Quotation	TAKACHI ELECTRONICS ENCLOSURE CO. LTD	64,433.00
88		IG230621114832038543	Email Quotation	Customs duty	20,734.00
89	KCC/PO/CPG/M/0098/21-22	B186-21/22 14.09.2021	Email Quotation	MALAVILA ELECTRICALS	44,975.00
90	KCC/PO/CPG/M/0099/21-22	LS-2122 6825, 18-10-2021	Email Quotation	JOS ELECTRICALS	11,120.00
91	KCC/PO/CPG/M/0058/21-22	G-12175	Email Quotation	UK AGENCIES & ELECTRICALS	11,445.00
92	KCC/WO/CPG/0024/21-22	349 , 25.03.2022	Email Quotation	AERON ENGINEERING	1,11,750.00
93	KCC/WO/CPG/0034/21-22	354, 28.06.2021	Email Quotation	AERON ENGINEERING	3,37,500.00
94	KCC/PO/CPG/M/0088/21-22	G-12174	Email Quotation	UK AGENCIES & ELECTRICALS	7,118.68
95	KCC/PO/CPG/M/0089/21-22	15631	Email Quotation	Usha Electricals	400.00
96	KCC/PO/CPG/M/0163/21-22	R21N024298	Email Quotation	WURTH ELECTRONICS SERVICES INDIA PVT LTD	25,250.00
97	KCC/PO/CPG/M/0172/21-22	879 18.12.2021	Email Quotation	FASTENERS & INDUSTRIAL COMPONENTS	26,239.20

SI No	PO No.	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (Without Tax)(RS)
98		962 07.12.2021	Email Quotation	FASTENERS & INDUSTRIAL COMPONENTS	8,001.80
99	KCC/PO/CPG/M/0197/21-22	B0821	Email Quotation	Kalyan Polymers	14,400.00
100	KCC/PO/CPG/M/0247/21-22	37	Email Quotation	CYBRON MANUFACTURING SOLUTIONS	1,600.00
101	KCC/PO/CPG/M/0189/21-22	221536 26.03.2022	Email Quotation	KEC, Karakulam	4,08,250.00
102		230010 21.04.2022	Email Quotation	KEC, Karakulam	4,79,250.00
103	KCC/PO/CPG/M/0261/21-22	3304196	Email Quotation	BHAVYA IMPEX PVT. LTD.	17,555.00
104	KCC/PO/CPG/M/0249/21-22	3304206	Email Quotation	BHAVYA IMPEX PVT. LTD.	7,254.00
105	KCC/PO/CPG/M/0258/21-22	3304195	Email Quotation	BHAVYA IMPEX PVT. LTD.	3,335.00
106	KCC/PO/CPG/M/0263/21-22	979/2021-22 21.02.2022	Email Quotation	RANGE ENTERPRISES,	35,259.00
107	KCC/PO/CPG/M/0039/22-23	EGC/448/T/222	Email Quotation	ELECTRONIC CABLE CENTRE	26,550.00
Total Invoice Value of Procured Through Email Quotation					Rs.1,27,25,844.50/-

Value of Items Procured Through cash Purchase

SI No	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
1	3257	Cash Purchase	Jalal M	550.00
2	P16049	Cash Purchase	Travancore Agencies	1,314.41
3	3418	Cash Purchase	Jalal M	4,872.00
4	C0003648	Cash Purchase	Subash Trade Links	6,040.68
5	C0003744	Cash Purchase	Subash Trade Links	6,223.72
6	P15659	Cash Purchase	Travancore Agencies	3,788.55
7	3375	Cash Purchase	Jalal M	4,322.00
8	VE/D010	Cash Purchase	Vitronix Enterprises	11,440.00
9	1966	Cash Purchase	GFM Sign	3,000.00
10	1852	Cash Purchase	GFM Sign	4,000.00
11	1768	Cash Purchase	GFM Sign	3,860.00
12	12	Cash Purchase	SIGMA	3,400.00
13	136	Cash Purchase	SIGMA	2,000.00
14	21	Cash Purchase	SIGMA	3,300.00
15	23	Cash Purchase	SIGMA	3,300.00
16	24	Cash Purchase	SIGMA	3,300.00

SI No	Invoice No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
17	25	Cash Purchase	SIGMA	3,300.00
Total Invoice Value Procured Through Cash Purchase				Rs.68,011.36/-

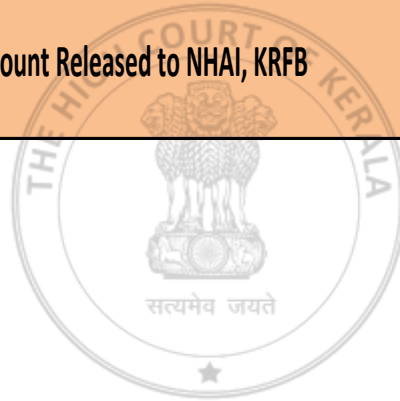


Value Of Production Of Enforcement System By Keltron

SI No	Invoice No.	Procurement Process	Total Invoice Value (With out Tax)(RS)
1	CPG/PRD/RLVDS/001/20-22 10/03/2021	Keltron Production	6,59,880.00
2	CPG/PRD/SVDS/001/20-22 20/03/2021	Keltron Production	1,11,880.00
3	CPG/PRD/3MPCAM/001/21-22 30/03/2021	Keltron Production	5,57,829.44
4	CPG/PRD/3MPCAM/002/21-22 30/10/2021	Keltron Production	37,85,271.20
5	CPG/PRD/3MPCAM/003/21-22 15/12/2021	Keltron Production	29,08,682.08
6	CPG/PRD/3MPCAM/004/21-22 15/02/2022	Keltron Production	26,29,767.36
7	CPG/PRD/3MPCAM/005/21-22 28/02/2022	Keltron Production	18,72,713.12
8	CPG/PRD/3MPCAM/006/21-22 14/03/2022	Keltron Production	16,93,410.80
9	CPG/PRD/MSVDS/001/21-22 15/03/2022	Keltron Production	1,50,760.00
10	CPG/PRD/AIPARK/001/21-22 19/03/2022	Keltron Production	3,85,500.00
Total Invoice Value for Production			Rs. 1,47,55,694/-

Details Of Amount Released to NHAI, KRFB

Sl No	Order No.	Procurement Process	Name of Supplier	Total Invoice Value (With out Tax)(RS)
1	Order No: 3487/SE-2/KRFB/2021	Permission Fee	Kerala Road Fund Board	48,876.00
2	Order No: 3487/SE-2/KRFB/2021	Permission Fee	Kerala Road Fund Board	7,983.00
3	Order No: KRFB/510/2022-SE	Permission Fee	Kerala Road Fund Board	13,898.00
4	Order No: 11247/RO-Kerala/Miscellaneous-clearances/1455	Permission Fee	NHAI	2,47,698.00
Total Amount Released to NHAI, KRFB				Rs. 3,18,455/-



RG (h)

TENDER DOCUMENT
(e-Procurement – two part tender)

Tender No: KSEDG/KCC/CPG/ENQ/0041/20-21 Dated 26-06-2020

Title – The Supply of different electronics modules, AIC modules, ANPRC modules, Vehicles for Mobile enforcement system, Supply Installation and commissioning of CCR , DCRs, field installation including street furniture, Software and Software Licenses on 5 year BOOT model with 5 year Warranty



KELTRON

KERALA STATE ELECTRONICS DEVELOPMENT CORPORATION LIMITED
(A Government of Kerala Undertaking) Keltron Communication Complex,
Monvila, Kulathoor, Thiruvananthapuram – 695 583, Kerala. INDIA

Tel: 0471-2598948 Fax: 0471-2598984

Email: kelkcc.pur@gmail.com

SECTION-1**NOTICE INVITING TENDER****Tender No.: KSEDC/KCC/CPG/ENQ/0041/20-21 Dated 26-06-2020**

Kerala State Electronics Development Corporation Limited (Herein as referred to as KELTRON) invites e-tenders from the interested parties for **The Supply of different electronics modules, AIC modules, ANPRC modules, Vehicles for Mobile enforcement system, Supply Installation and commissioning of CCR , DCRs, field installation including street furniture, Software and Software Licenses on 5 year BOOT model with 5 year Warranty** The Schedule of Requirement given in the General Terms & Conditions of the Tender.

1. The sites are distributed in the state of Kerala.
2. Non-Refundable Tender Fee & Refundable EMD should be submitted as online mode.
3. The tender document should be submitted as per formats along with all relevant documents in support of qualifications and experience.
4. Tender Documents shall be available only on the Kerala Government E-Tender site and shall not be available for sales elsewhere.
5. KELTRON reserves all the right to amend or cancel the tender in part or in full without prior notice at any point of time
6. The Special Instructions to the Contractors/Bidders for the e-submission of the bids are given under "Help to Contractors" in website <http://etenders.kerala.gov.in/nicgep/app>

Schedule of Requirements

Sl. No.	Item description	EMD	TENDER Fee (Rs.)	Contract period	Bid closing date
1	The Supply of different electronics modules, AIC modules, ANPRC modules, Vehicles for Mobile enforcement system, Supply Installation and commissioning of CCR , DCRs, field installation including street furniture, Software and Software Licenses on 5 year BOOT model with 5 year Warranty	Rs 1,00,00,00 (Indian Rupees Ten Lakhs only)	Rs 25000/-+ GST Extra	5 Years.	17.07.2020

SCHEDULE OF IMPORTANT EVENTS/ ACTIVITIES

Sl. No.	Event	Date
1	Notice inviting Tender	26.06.2020
2	Last date for submission of queries /clarifications by the prospective bidders.	30.06.2020
3	Pre-bid meeting	01.07.2020
4	Reply on clarifications	03.07.2020
5	Last Date of submission of Tender/Bid	17.07.2020
6	Date of technical evaluation starts	18.07.2020
7	Demonstration and Presentation at TVPM	20.07.2020
8	Financial bid opening	22.07.2020

Address for Communication and Pre- Bid queries:

Head Purchase
Kerala State Electronics Development Corporation Ltd.
Keltron Communication Complex,
Monvila, Kulathoor P.O., Thiruvananthapuram-695 583, Kerala
Tel: 0471-2598948 Fax: 0471-2598984
Email: kelkcc.pur@gmail.com

1. GENERAL INSTRUCTIONS

1.1 NAME OF WORK:-

Title – The Supply of different electronics modules, AIC modules, ANPRC modules, Vehicles for Mobile enforcement system, Supply Installation and commissioning of CCR , DCRs, field installation including street furniture, Software and Software Licenses on 5 year BOOT model with 5 year Warranty

1.2 Scope of the TENDER:-

The Supply of different electronics modules for manufacturing of Automated Radar based Speed Violation Detection System (SVDS) , Modules for manufacturing of AI Camera (Artificial intelligent) based Enforcement System, Modules for manufacturing Mobile Speed Violation Detection Systems and Vehicles, Modules for Red-light Violation Detection Systems(RLVDS) and Modules for Unauthorized Vehicle Parking Detection System(UVPDS), Supply & Installation of Central Enforcement Control room(CCR) and associated Software modules, Supply & Installation of District Control rooms(DCR), field installation of Enforcement Systems with 5 year Warranty support.

All accessories necessary for the Commissioning, Operation and Maintenance of the supplied field hardware module, software, Control room HW and SW, Supply and installation of field Hardware equipment are also deemed to be included in the scope of supply without any additional cost to KELTRON. License fee if any for the software other than those mentioned in the tender which may be required to operate the Equipments / Systems shall be to the Bidder's account without any extra charge.

1.3 Scope of the work

The Supply of different electronics modules for SVDS,RLVDS, Vehicle mounted SVDS, ANPR camera modules, AI camera modules, Vehicles for Mobile enforcement system, Supply, Installation and commissioning of CCR, DCRs , field installation including street furniture and Warranty support for 5 years(3 Year Warranty and 2 year AMC) on BOOT model for 5 years

The selected Bidder shall do the Supply of different electronics modules for SVDS,RLVDS, Vehicle mounted SVDS, ANPR camera modules, AI camera modules, Vehicles for Mobile enforcement system, Supply, Installation and commissioning of CCR, DCRs , field installation including street furniture and Warranty Support for 5 years(3 Year Warranty and 2 year AMC) on BOOT model for 5 years



1.4 GENERAL INSTRUCTIONS- TECHNICAL

- a. The selected bidder shall supply all enforcement modules, supply and installation of all IT (active and passive) and Non-IT components, completion of CCR and 12 DCRs, supply and configuration of all related software and licenses. Installation shall mean to install, configure and integrate every component and subsystem component, required to rollout the project including the central control room and 14 district control rooms within the allotted time.
- b. The selected bidder shall provide 5 year onsite comprehensive support (3 year warranty + 2 Year AMC) for the entire systems supplied including control rooms infrastructure.
- c. The selected Bidder shall arrange & provision all lease line required for Central Control Room, District Control Rooms , All Enforcement Systems 4G connections and all electricity connections required for Central Control Room, District Control Rooms and Field Systems (if required).
- d. The selected Bidder shall configure the database server, application server & the webserver required for the traffic automation and management rollout. The selected Bidder also should establish the interface required for connecting the automation software with payment gateway for enabling the defaulter's to make online payment.
- e. The selected bidder shall arrange to undertake all necessary electrical & networking in central location & 12 District centers.
- f. The selected Bidder shall arrange, provision Fire alarm, smoke detection, Fire-extinguisher, Air-conditioning, Automatic control system for AC. Electrical lighting & related civil and electrical works for the Central Control Room.
- g. The selected Bidder shall provide a resident engineer who is having very good experience in Network management and Data Centre management at the Central Control Room for managing the system for a period of Three years.
- h. The selected Bidder shall provision a web based employee management system for central & remote locations.
- i. The selected bidder shall arrange to undertake all the necessary civil, electrical, plumbing and mechanical works including false ceiling, flooring, partitioning, installation of electrical components, cable laying and other necessary services to create the Non-IT/ Physical infrastructure at the central control room site and other 12 District Control Rooms. Bidder can inspect site for assessing as-is condition.
- j. The selected bidder shall arrange to interface the enforcement and payment management system with VAHAN.
- k. The Central Control Room shall be tested for the following parameters:
 1. Design and implementation of WAN Connectivity
 2. Design and implementation of Application Access



3. Design and implementation of Backup & restore system
4. Desktop connectivity
5. Design and implementation of Electrical Requirements
6. Design and implementation of Cooling & Environmental Control
7. Design and implementation of Automatic multibank Ac controlling system
8. Design and implementation of Smoke & Fire Detection, Prevention & Suppression requirements
9. Design and implementation of Surveillance & Physical Security
10. Design and implementation of LAN Passive Components
11. Design and implementation of Gateway level IT security
12. Successful hosting of Enforcement application
13. Training on infrastructure components supplied in the Central Control Room and District Control Rooms (12 district headquarters)
14. Generation of documents during design, installation, commissioning and training
15. Milestone shall be mandatory and be made available to the Tendering Authority.
 - a. Central Control Room and District Control Rooms
 - i. Site survey
 - ii. Submission of detailed items specifications (BOM) with drawings of each site
 - iii. Starting and completion of Civil, Electrical, Interior work & furnishing and IT Infra at each site.These all should be based on the time schedule given by Keltron.
 - b. Enforcement system installation at site for AI Camera System, SVDS,RLVDS and for MSVDS System..
 - i. Submission of site survey report including GPS coordinate and District map based on the direction by Keltron.
 - ii. Submission of BOM district wise.
 - iii. The schedule of site installation to be completed as given by Keltron.
16. The selected bidder is responsible for **Network Management Service**: The objective of this service is to ensure continuous operation and upkeep of the LAN & WAN infrastructure at the Central Control Room including all active and passive components. WAN link is available at all 14 District control rooms. For overall functioning of the system, the selected bidder shall be responsible to coordinate the WAN link related issues. The service to be provided for Network Management during entire 5 year period.
17. Ensuring that the network is available as per the prescribed SLAs
18. Attending to and resolving network failures and snags as per the prescribed SLAs

19. Support and maintain the overall network infrastructure including but not limited to LAN passive components, routers, switches, and firewall- UTM.
20. Configuration and backup of network devices including documentations.
21. Provide information on performance of Ethernet segments, including capacity utilization and error statistics for the segment and the top-contributing hosts, WAN links and routers.
22. Installation and re-installation of the network devices in the event of crash/ failures.
23. Tuning of various parameters to optimize performance and to ensure industry standard QoS with customization is being delivered.

24. **Backup / Restore Services:**
 1. All the data storage will be done on the SAN solution provisioned by the bidder. The backup solution shall be based on LTO tape drive.
 2. Backup software should be provided to check the data integrity and scheduling of backup
 3. Monitoring, log maintenance and reporting of status on a regular basis during warranty period (5 Years)
 4. 24 X 7 support shall be provided for the Central Control Room.

25. **Configuration/ Reconfiguration Management Services:**
 1. The complete configuration including reconfiguration as and when required and engineering work order (EWO) shall be provided before any configuration/reconfiguration by Keltron.
 2. ITIL V3 based Ticketing tool for SLA management
 3. Any other equipment, hardware/software installed under the project.

26. **Subcontracting:**
 1. The bidder in its technical document shall provide the list of services planned to be subcontracted. The subcontractor shall not be entertained for core activities like data security, data integrity, configuration of the equipment and the facility management. The bidder should give the list of subcontracting companies name and other details if any. Keltron reserves the right to approve or disapprove.

1.5 GENERAL INSTRUCTIONS

1. The tenderers are requested to quote their lowest rates separately as per the Price Bid format.



2. For awarding the tender for work, the entire project will be considered as a single work. There will be no separate work divisions or separate awarding of works to different bidders.
3. Proposals must reach the tendering authority on or before the last date and time specified. Late proposals will be rejected.
4. The proposed Automation system software and the related infrastructure component must set up at the customer defined location.
5. The UPS units must be configured in redundancy mode and two different power paths must be made available in the Central Control Room.
6. Access to Central Control Room premises must be restricted and monitored using adequate access control systems
7. Suitable fire protection systems must be provided.
8. Minimum uptime as per the SLA must be ensured for the Central Control Room infrastructure components.
9. Data cabling required for desktops, Printer etc.. in the central & remote Control Room must be cat 6 structured cabling.
10. Control Room WAN connectivity between Central Control Room and the 14 District Control Rooms must be provided.
11. Keltron has the right to disqualify any vendor if they fail to provide the necessary clarifications or documents.
12. The vendor has to complete the work as per the time schedule proposed.
13. The selected bidder shall design the required Infrastructure in line with the technical & functional requirement of the traffic automation system. The design should ensure an uptime of 99% at the central location on a quarterly basis.
14. Bidder can visit the proposed site, if they required.
15. The Central Control Room server room entrance and exit must be made accessible using Biometric and proximity cards.
16. The Central Control Room server room must be provided with redundant active distribution paths from diverse power sources using control devices.
17. Proper electrical earthing to devices in Central Control Room and 14 district Control Rooms to be provided. As per IS Industrial standards.
18. Fire detection and suppression system must be properly installed in the Central Control Room.
19. Fire alarms are to be procured and installed in the Central Control Room.
20. The vendor while submitting the proposal must specify any additional equipment / requirement needed for any facility.
21. The vendor must specify the specifications (make, model, capacity, type etc.) while submitting the proposal.
22. If any deviation in the specification, must be informed with reason.



23. Structured data cabling and electrical cabling for Central Control Room and the 12 District Control Rooms
24. Supply of racks for mounting equipment at Central Control Room and District Control Rooms with APC, Rittal or any other reputed make..
25. AC bank control and management system
26. Surveillance system for central and District Control Rooms
27. EPBX system with phones should be provided at Central Control Room and at 12 District Control Rooms
28. Redundant UPS system in Central Control Room and UPS systems for District Control Room. (Keltron is the preferred Make. Vender can quote with other specified make only after getting prior permission from Keltron with valued reason)
29. Surveillance system for Central Control Room and District Control Rooms
30. High speed laser printer at Central Control Room and District Control Rooms
31. Desktops for Central Control Room and District Control Rooms
32. E- security at gateway level
33. The decision of Keltron in all matters will be final.

1.6 SUBMISSION OF TENDER:-

The TENDERS are to be submitted through Kerala Government E-Tender site and should be addressed to

Head Purchase

Kerala State Electronics Development Corporation Ltd.

Keltron Communication Complex,

Monvila, Kulathoor P.O.,

Thiruvananthapuram-695 583, Kerala

Tel: 0471-2598948 Fax: 0471-2598984

Email: kelkcc.pur@gmail.com

1.6.1 THE TENDER SHOULD CONTAIN THE FOLLOWINGS

- Pre-qualification Bid and Documents signed on all pages under seal.
- Company Resolution/Power of Attorney authorizing the person to sign all the documents pertaining to this tender
- Documents to prove OEM status/ authority if not OEM, manufacture's Authorization Form - MAF should be submitted
- All the documents mentioned in minimum eligibility criteria (Sl. No. 2 in page no: 21).
- Commitment of single source responsibility in the company's letterhead.
- Booklets/ pamphlets on products if any



- Copy of ISO certifications
- Additional information on products if any.

1.6.2 OPENING OF PRICE BID

1. The price bid of those tenderers who have pre-qualified by the pre-qualification committee alone will be opened in a later date duly notified in the tender notification.
2. Unless accepted in writing, the conditions of the Tender document will be valid and no extension for submission of Tenders will be granted on any account
3. KELTRON is not bound to accept the lowest offer and is having absolute right to reject any or all the tenders without assigning any reason.
4. Jurisdiction: The Courts situated in Thiruvananthapuram alone will have jurisdiction on the Contract.
5. The Tenderers are required to comply with the statutory requirements in respect of the Tender submitted by them.
6. The language of the Tender should be English and the corrections, if any, should be attested under seal.
7. The Tender should be submitted by the authorized signatory. Power of Attorney authorizing the person to sign all the documents pertaining to this tender shall be submitted.
8. The Tenderers are to be aware of the conditions of the locations of supply and installation and should have a clear idea of the plan of action.
9. The Tenderer should be a reputed **Original Equipment Manufacturer (OEM)** or OEM authorized Vendor having sound technical and financial capabilities and also having strong service presents in Kerala
10. The intending tenderer/OEM should have authorized service and support center at Thiruvananthapuram. Or give declaration for setting up of service/support center before the roll out of the project
11. The Purchaser reserves the right to vary the quantities of items by 25% with prior notice.
12. At any time prior to the deadline for submission of Tenders, KELTRON may, for any reason, whether at its own initiative or in response to a clarification requested by any prospective Bidder, modify the Tendering documents by amendment.
13. The amendment will be notified by Email to all prospective Bidders which have received the Tendering documents and will be binding on them. The amendment will be attached to the Tendering documents.

1.6.3 COMMERCIAL CONDITIONS

1. **Earnest Money Deposit (EMD):** The amount of EMD for the Tender is given in the

Tender Notification. No adjustments against any other pending payments to the tenderer from Keltron are allowed. EMD be given through E-Tender site. Bidders without EMD will be rejected.

2. **Tender Fee:** Bidders without Tender fee will be rejected.
3. **Security Deposit/ guarantee:** The successful Bidders shall, before he enters in to an agreement in writing, deposit a sum of Indian Rupees 6 (Six) Crores in the form of Demand Draft favoring Kerala State Electronics Development Corporation Ltd KELTRON payable at Thiruvananthapuram. As security deposit. The Security Deposit will be released only after 5 years of warranty and AMC. The Warranty period will start only after successful completion of the project. No interest is payable for this security deposit during the period.
4. **Agreement:** The successful Tenderer, immediately on receipt of the Letter of Acceptance should return the marked copy duly acknowledged in token of acceptance and should execute the agreement in stamp paper worth Rs. 200/- within 15 days of the receipt of the LA. After that Confirmed Work Order will be released by KELTRON.
5. **Delivery, Installation and Commissioning and Training:** The equipments are to be delivered and installed within the stipulated time at the locations given. Advance intimation should be given to the consignee and to this office before delivery. The contractor shall be liable to complete all deliveries, installation and commissioning and training of the item supplied within the stipulated period from the date of detailed purchase order. Failure shall lead to automatic cancellation of the purchase order unless purchase order is extended on or before the expiry of the delivery date. In such cases the contract ceases and the security deposit will be forfeited.
6. **Delivery Period:** The materials shall be supplied, installed and commissioned as per the conditions of the contract.
7. **Penalty:** In case the supplier could not supply as per the agreement without sufficient reasons within the specified delivery period penalty will be charged @ 0.1% per month of the balance contract value to be performed subject to a maximum of 10%. (If any problem which will be out of control of the bidder, the period will be excluded from counting the penalty). In case the contract is not completely and satisfactorily performed, Keltron has the right to terminate the contract at the risk and cost of the contractor and forfeit the Security Deposit.

8. **Price:** Price quoted should be firm in all respects for delivery and installation, testing, commissioning and training with 5 year onsite comprehensive warranty (3 year Warranty + 2 Year AMC) for the period of six months from date of opening of the tender. The prices quoted should be inclusive of all taxes, freight, installation charges and other levies if any. No extra money will be paid at any case. This should be as per the price schedule enclosed in the E- tender. However basic price, duties and taxes may be shown separately with the total cost.
9. The tenders will be evaluated based on the total basic price quoted for all the items taken together
10. The Purchase orders will be sent by registered post
11. **Payment:** Payment will be quarterly in 20 equal installments starting from first quarter after go live on back to back basis (within 3 days after getting the payment from the department). Vender will be required to submit the following reports (district wise) signed by the respective Head of the office at the end of every quarter to effect the payment.
- Performance certificate
 - Preventive Maintenance Report
 - Downtime penalty statement
 - Statutory deductions like input GST credit, etc shall apply. GST charged by the vendor will be released after ensuring input tax credit in GST portal.
12. **Training:** Training is to be imparted to persons who are recommended by Keltron at each point of installation about installation & basic operation of the System and simple maintenance of the System at no extra cost.
13. **Consignee:** The consignees for the System and accessories will be given later.
14. **License:** For the Operating System and other packages, the license name will be given later. The validity should be for the entire warranty and AMC period of 5 years after go live.
15. **Taxes:** The percentage of Taxes and Duties taken in the Tender, if any, should be indicated clearly. No hidden cost will be allowable on later stage.
16. **Transport and handling:** The expenses for transporting the items to various



- locations, handling at the locations etc. will be to the Contractor's account.

17. Insurance: The items to be supplied shall be insured for transit and handling including at the locations at the suppliers expense till the installation, testing and commissioning of the System.

18. Change of Ownership: The obligation of the supplier company/Firm under this contract shall not cease even if the ownership changes. The successor in interest or transferee shall have the obligation to perform the contract.

19. General Guideline for bidder for work execution and labor engagement

a. CHILD LABOUR ACT

No Contractor shall employ any child having age 5 years to 14 years, as it is prohibited by the Child Labour Prohibition and Regulation Act, 1986. The Hon. Supreme Court has given certain guidelines and as per the guidelines, if employment of child labour is detected on the site work, the employer i.e. the Contractor shall have to deposit Rs. 20,000/- (Rupees Twenty Thousand only) in the Child Labour welfare Fund. If the employer refuses to deposit, then action will be taken for contempt of Court of the Supreme Court Judgment and also will be prosecuted by the concerned authority. Due to any breach of any provision of the Child Labour Prohibition and Regulation Act, 1986, by the Contractor and for that Keltron has to pay any amount, then the Keltron shall recover the said amount from the Contractor.

b. SAFETY MEASURES AND SERVICES

The Contractor shall be responsible for the safety of all workmen and other persons entering or in the works and shall take all measures necessary to ensure their safety to the approval of the Engineer's Representative. Reference in these respects shall also be made to the Conditions of Contract and safety provisions but in particular, such measures shall include the following:

- i. Provision of proper safety and emergency regulations' fire, gas and electric shock precautions, stretchers, first-aid box and fire extinguisher together with rescue facilities generally for each place of working;
- ii. Provision of efficient safety helmets for all personnel including the Engineer's Representative and each of his staff and any authorized visitors to site;
- iii. Safe control of water including provision of ample standby generating and pumping plant;



- iv. Provision and maintenance of suitable lighting to provide adequate illumination of works with appropriate spares and standby equipment;
- v. Provision and maintenance of safe, sound mechanical equipment, each item of plant having an up-to-date testing certificates ;
- vi. Provision and maintenance of safe, sound, ropes, slings, pulleys and other lifting tackle, each appliance having an up-to-date testing certificate where appropriate;
- vii. Provision of notices 1.25 m x 1.5 m size written in bold letters in English, Malayalam and Hindi to be erected on existing footpaths and at points of access likely to be used by the public, which shall warn the public of the Works. These notices shall be in addition to any statutory requirements demanded of the Contractor.
- viii. Contractor shall provide and maintain at his own expenses all lights, guards, fencing and necessary watchmen when and where necessary or required by Owner/ Engineer for the protection of the works or for the safety and convenience of those employed on the works and the public. Contractor shall also provide at his cost traffic barricades, men for diverting and controlling traffic, necessary sign boards for diversion of traffic. In the event of failure on the part of Contractor, Owner man with or without notice to Contractor put up a fence or improve a fence already put up or provide and/or improve the lighting or adopt such other measures as he may deem necessary, and all the cost of such work and procedures as may be adopted by Owner/ Engineer shall be borne by Contractor. Maintenance of adequate warning and general lighting at nights at place of work is essential.

c. LIABILITY OF ACCIDENTS TO PERSONS

Responsibilities and liabilities of the contractor under Workmen's Compensation Act.

- i. On the occurrence of an accident, which results in death of workmen employed by the contractor or which is as serious as is likely to result in death of any such workmen, the Contractor, shall within 24 hours of happening of such accident(s) intimate, in writing, to the Engineer in charge the fact of such accident(s). The contractor shall indemnify Keltron against all loss or damage sustained by Keltron resulting directly from his failure to give intimation in the manner aforesaid including the penalties or fines, if any, payable by Keltron as consequence of Keltron's failure to give notice under the Workmen's Compensation Act or otherwise to conform to the provisions of the said Act in regard to such accidents(s).
- ii. In the case of an accident, in respect of which compensation may become payable under Workmen's Compensation Act, whether by the Contractor or by Keltron as principal Employer, it shall be lawful for the Engineer-in-charge to retain out of money due and payable to the Contractor, such sum or sum of money as may, in the opinion



of Keltron, be sufficient to meet such a liability. The opinion of the Engineer in charge shall be final in regard to all matters arising under this clause.

d. CLEARING SITE ON COMPLETION

- i. On completion of the Works, the Contractor shall clear away and remove from the site all Constructional Plant, surplus materials, rubbish, Temporary Works of every kind and leave the whole of the site and the works clean and in a workmanlike condition to the satisfaction of the Engineer, failing which he will be penalized as per rules and regulations of the Keltron.
- ii. The Contractor shall comply with the above requirements shall clear, regard terrace, level topsoil and grass all his working areas as instructed by the Engineer's Representative. No separate payment shall be made on his account.
- iii. Only license and permit holder persons must be employed for the job. The Keltron will not be responsible for any accident or injury to the workman / staff of the contractor. No compensation of any kind shall be paid by the Keltron. The Contractor shall observed latest Government rules regarding labours etc.
- iv. All the statutory payments of the staff deployed for the works has to be borne by the bidder. Any complaints filed by the employees of the contractor shall be settled amicably by the contractor himself and in no way Keltron will be responsible.

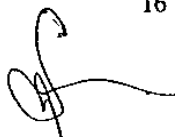
1.7 OTHER TERMS & CONDITIONS OF THE PROJECT.

- a) Completion of the project: March 2021 or 9 months whichever is earlier. On completion of the project, each of the sites shall be subjected to the test by the Technical Committee and after having certified the same satisfactorily it shall be deemed to have been accepted by the Department.
- b) The AMC charges for 6th & 7th year shall be at the rate of 5% per annum which is not included in the price. The AMC charges for 8th, 9th and 10th year shall be entered on mutually agreed terms between Vendor and KELTRON.
- c) Training: Training & Documentation for the operation of the systems will be given to KELTRON officers as required without any additional charge.
- d) Installation of Enforcement cameras: All permissions for the installation of enforcement camera systems at road side shall be provided by KELTRON.
- e) Access to VAHAN: Permission to access vehicle database from VAHAN shall be provided by KELTRON.
- f) Sufficient space for setting up of District & State control rooms shall be provided by KELTRON.

- g) Permissions from other departments: KELTRON shall facilitate other department permissions if any for performing the installation work.
- h) The proposed project is on BOOT model for 5 years.
- i) All recurring cost like power charges, connectivity charges, consumable charges for enforcement chellans, chellan processing and despatch charges, Manpower charges are not included. Except initial connection charges
- j) After the bidding process, KELTRON shall enter into an agreement with the vendor chosen for the implementation of the project and ensure that the project is completed as per the terms and conditions enumerated in the proposal without any deviation.
- k) KELTRON shall have the right to cancel the contract for any default on the part of BIDDER in the due performance thereof with valued reason. The cancellation shall be made only after giving due notice to VENDOR and after due process of the explanation/rectification/clarification given by VENDOR.
- l) BIDDER agrees that any communication addressed to them may be handed over to the registered office address or may be sent to the address as mentioned in the agreement.
- m) The percentage of taxes and duties quoted in the proposal, if any, should be indicated clearly. If there is any reduction or increase in the percentage on the rate of taxes & duties, the same should be passed on to KELTRON.
- n) In case the contract is not completely and satisfactorily performed by BIDDER, KELTRON has the right to terminate the contract at the risk and cost of BIDDER.
- o) In case the number of enforcement from one camera during one month is less than 300 numbers then that cameras shall be relocated after discussion with the KELTRON officials free of cost.

1.8 PERFORMANCE GUARANTEE

- a. The offer shall be inclusive of a comprehensive onsite Performance Guarantee for 5 years for all the items from the date of commissioning. BIDDER shall maintain systems and peripherals supplied and installed under this contract in accordance with the provisions laid down in the clauses below.
- b. Scope and Services covered under performance Guarantee:
- c. Bidder shall provide the following services under the performance guarantee to keep the systems and peripherals in good working order.
- d. Application Support: The supply is comprehensive inclusive of Back end' Applications including OS support on all the systems supplied and installed under this contract against any manufacturing defect. Any problem related with Applications shall be attended & rectified by Bidder. All required device drivers shall be provided by Bidder.
- e. Scheduled preventive maintenance (PM) shall be carried out once in Three Months for



all systems.

1.9 SERVICE ASSURANCE:

Bidder shall also ensure an availability of minimum 95% for all the systems & accessories on a yearly basis. This means that all the systems & accessories covered under this performance guarantee shall be in operating condition at least on 95% of the normal working hours in a year.

1.10 DOWNTIME PENALTY (against any manufacturing defect)

- a) Downtime penalty will be charged for after 48 Hours.
- b) The downtime penalty will be Rs.100 per week per Field hardware unit.
- c) The downtime penalty will be Rs.100 per day per Desktop computer
- d) The downtime penalty will be Rs.200 per day per UPS.
- e) The downtime penalty will be Rs.200 per day per Switches/Router.
- f) The downtime penalty will be Rs.300 per week per Server & Storage.
- g) The downtime penalty will be Rs.500 per week for backend applications
- h) The downtime penalty will be Rs.1000 per day for each District Control Room shutdown.
- i) The downtime penalty will be Rs.10,000 per day for State Central Control Room shutdown.

1.11 TERMS OF PERFORMANCE GUARANTEE

- a) If KELTRON is not able to hand over the system to VENDOR for maintenance purpose, such time will not be considered for the down time penalty.
- b) In case of intermittent failures and repetitive problems due to improper diagnosis or repair, the system will be treated as continuously down.
- c) VENDOR is not liable for problems arising out of breakdown or services or spares cost, arising out of damages caused due to mishandling of any equipment by the Department, fire, theft, riots, accidents, earthquakes, storm and other natural calamities.
- d) KELTRON/Department will keep a System Maintenance Register (at mutually agreed location) which is a record of machine failure including the nature of failure, date and time of booking the complaint, when the machine was put back in to service and the total down time. This record will be signed mutually by the authorized officer of the KELTRON/Department and by VENDOR's Service Engineer.
- e) To monitor the overall performance of the project, maintenance activities and other

- project related matters, periodic meeting between Enduser Department and KELTRON shall be conducted.
- f) The failure of performance due to failure on the part of KSEB Power & Data Connectivity or due to Natural Calamities, any pandemic situations, Riot, Damage due to Accident or Theft will not be liable by VENDOR at any extent.
- g) The performance issue or failure due to improper handling or due to consumables will not be liable by VENDOR.

1.12 FORCE MAJEURE:

In case of unforeseen events such as war, VENDOR shall not be liable or deemed to be default of any delay or failure in performance stated herein resulting directly or indirectly from causes beyond his reasonable control. If VENDOR is prevented from performing their functions under the instrument for a period longer than six months due to fire, theft, earthquake, flood, accidents, riots, lockdowns, any natural calamities or any pandemic situation etc, the VENDOR's liability ceases. If a Force Majeure situation arises, the VENDOR shall promptly notify KELTRON in writing on such conditions, the cause thereof and the change that is necessitated due to the conditions within 10 days before. Until and unless otherwise directed by KELTRON in writing, the VENDOR shall continue to perform its obligations under the agreement as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event. Then both the parties shall discuss the course of action to be taken afterwards.

1. All the quarterly payment will only be made as per the contract.
2. In case the VENDOR fails to supply and deliver any of the said products and services within the time provided for delivery of the same or in the case the VENDOR commits any breach of any of the covenants, stipulation and agreement herein contained and on his part to be observed and performed, then and in any such case, it shall be lawful for the KELTRON (If he deems fit to do so) to arrange for the purchase of the said articles and equipment's elsewhere, or, on behalf of the KELTRON, by an order in writing of the KELTRON, to put an end to this contract; and in case KELTRON shall have incurred, sustained or been put to any costs, damages or expenses by reason of such purchases or by reason of this contract having been so put an end to or in case any difference in price, compensation loss costs, damages or expenses or other money shall then or at any time during the continuance of this contract be payable by the VENDOR to the KELTRON under and by virtue of this contract it shall be lawful for the KELTRON from and out of any moneys for the time being payable or owing to the VENDOR from the KELTRON under or by virtue of this contract or otherwise to pay and reimburse to the

KELTRON all such costs damages and expenses they may have sustained, incurred or been put to, by reason of the purchase made elsewhere or by reason of this contract having been so put an end to as aforesaid; and also all such difference in price, compensation, loss, cost damages, expenses and other moneys as shall for the time being be payable by the VENDOR as aforesaid.

3. In case any difference or dispute arises in connection with the contract, all legal proceedings relating to the matter shall be instituted in the Court within Thiruvananthapuram City.
4. In case, where VENDOR after having made partial supplies fails to fulfill the contract in full, all or any of the materials not supplied may at the discretion of the KELTRON, be purchased by means of another tender/quotation or by negotiation and the loss if any, caused to the KELTRON shall hereby together with such sums as may be fixed by the KELTRON towards damages be recovered from VENDOR as a debt due to KELTRON.
5. Every notice hereby required or authorized to be given may be either given to the VENDOR directly or left at the firm or last known place of abode or business or may be handed over to its agent personally or may be addressed to the VENDOR by post at its usual or last known place of abode or business and if so addressed and posted shall be deemed to have been sufficiently served on the VENDOR on the date on which in the ordinary course of mail a letter so addressed and posted would reach his place of abode or business. The VENDOR shall intimate the KELTRON any change in his place of business or address.
6. Jurisdiction: The validity and interpretation of this agreement shall be governed by the laws of India only. Courts located at Thiruvananthapuram in the State of Kerala alone shall have jurisdiction.
7. Resolution of Disputes: Any or all dispute between the parties will be settled amicably between the parties through mutual discussions by the signatories or their designated nominee. Failing amicable settlement, both parties agree to refer the dispute to the Managing Director, KELTRON, Thiruvananthapuram.
8. Amendment: No amendments to this document shall be binding on either party except in writing signed by duly authorized representatives.
9. Confidentiality: Each party shall maintain the confidentiality of any information it receives from the other party that has been designated as Confidential (Confidential Information) and shall use it only for the purpose of this agreement and not any private or commercial gain. This Confidentiality obligation shall not apply to information in which recipient party can prove in writing was at the time of disclosure.

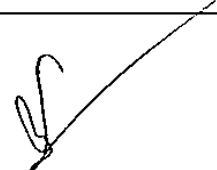
- a. In the public domain

- b. Lawfully in its possession and not acquired directly or indirectly from a third party under an obligation.
 - c. Furnished to the receipt without restriction by a third party having a bonafide right to do so
 - d. Public Knowledge by act or acts beyond the recipients control or
 - e. Required to be disclosed by law or pursuant to a judicial order.
10. Completion, testing, acceptance and delivery: The VENDOR shall make all reasonable endeavors to complete the project in accordance with the proposal. No variation shall be allowed in the proposal except under circumstance subject to mutual consent of the parties to the contract. On completion of the project, each of the sites shall be subjected to the test by the Technical Committee and after having certified the same satisfactorily it shall be deemed to have been accepted by KELTRON. Each deliverable shall be accepted by KELTRON on having successfully completed the acceptance procedure.
11. Before the final inspection of the project implementation at each district, vendor should submit to Keltron
- a. All the serial Numbers with Make, Model, Quantity of all equipment installed district wise.
 - b. Network design document district wise
 - c. Details of the Electricity Connection and data connectivity at each district and Central Control Room
 - d. Details of the Overall system Network diagram
 - e. Details of the Internet security configuration diagram
 - f. All IP configuration details
 - g. Overall system architectural & system configuration design diagram
 - h. Details of all passwords and settings.



2. MINIMUM ELIGIBILITY CRITERIA

Sr. No	Qualification Criteria	Documents/Information to be Provided in the submitted Proposal	Responsibilities
1.	The bidder shall be single bidder or consortium. In case of consortium, maximum number of consortium members including Lead Bidder shall be 3. The firm should be a company incorporated and registered in India under the companies Act, 1956/2013.	Proof of documents	
2.	The Bidder/ Lead Bidder should be in continuous operation for at least 10years as on bid publishing date	Proof of documents	
3.	The Bidder, The Lead Bidder and the consortium partners (If a Consortium) should be registered with GST Authorities and should have a valid PAN number	Proof of Documents	Both Lead Bidder and Consortium Partner should qualify Individually
4.	The Lead Bidder's average annual financial turnover should be equal to or higher than Rs. 50 crores in last 3 financial years (FY 2016-17, FY 2017-18, FY 2018-19 / 2019-20). Audited balance sheet for last three financial years should be submitted. In case the financial turnover of previous	Audited Balance sheet for the last three financial years to be submitted with the audit report.	Lead Bidder should qualify

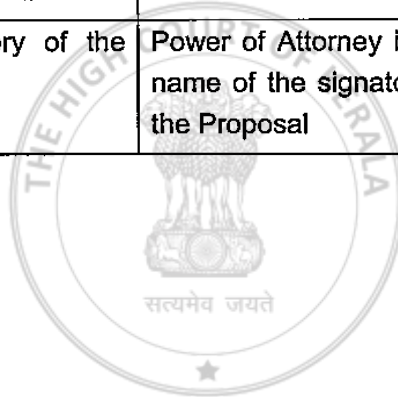


Sr. No	Qualification Criteria	Documents/Information to be Provided in the submitted Proposal	Responsibilities
	<p>financial year 2019-20 is not finalized till the submission of bid, the provisional financial turnover for the year ending 31.03.2020 should be submitted by the bidder, in which case, the audited financials FY 31.03.2020 shall be furnished immediately when completed and no later than the date announced for award of work, if selected</p>		
5.	<p>The Net Worth of the Bidder/ Lead Bidder must be positive as per the last three financial year's 2016-17, 2017-18, 2018-19/2019-20 audited Balance Sheet. In case the financial turnover of previous financial year 2019-20 is not finalized till the submission of bid, the provisional financial turnover for the year ending 31.03.2020 should be submitted by the bidder in which case, the audited financials FY 31.03.2020 shall be furnished immediately when completed and no later than the date announced for award of work, if selected.</p>	<p>Certificate from practicing Chartered Accountants for Net worth</p>	

Sr. No	Qualification Criteria	Documents/Information to be Provided in the submitted Proposal	Responsibilities
6.	The Bidder/ Lead Bidder or its Consortium Partner should be ISO 9001 certified.	Copy of certification which is valid on date of submission, to be submitted	Lead Bidder or Consortium Partner should qualify
7.	The Bidder/ Lead Bidder should have successfully executed / executing an IT project which includes ICT Infrastructure, with at least 1 (one) Central / State Government / PSU in India. The project cost should not be less than Rs. 20 crores during the last 3 preceding years ending March 2020.	Documentary evidence for ongoing projects to be provided along with the Work Order / Contract	Lead bidder should qualify
8.	The Bidder/Lead Bidder should have a single IT/ ITeS / ICT project of minimum Rs. 25 crores in the last five years which is already completed or ongoing for Central / State Government / PSU in India	Documentary evidence for ongoing projects to be provided along with the Work Order / Contract	Lead bidder should qualify
9.	The Bidder/Lead bidder should have executed / executing at least 3 ICT Infrastructure projects during the last 3 years with project value of more than Rs. 5 crores for Central / State Government / PSU in India. Atleast one project should have value of more than Rs. 25 Crores	Documentary evidence for ongoing projects to be provided along with the Work Order / Contract	Lead bidder should qualify



Sr. No	Qualification Criteria	Documents/Information to be Provided in the submitted Proposal	Responsibilities
10.	The Bidder/ Lead Bidder, its Consortium Partners and the OEM should not have been black-listed by any State / Central Government / PSU Departments.	Self-Declaration to be submitted	Lead Bidder, its consortium partner and the OEM should comply
11.	The Bidder/Lead Bidder or its consortium partners should have minimum 200 Engineering/Technical resources on their Rolls	Self-Declaration Letter from HR to be submitted	Lead Bidder or Consortium Partner should qualify
12.	Authorized Signatory of the Bidder/Lead Bidder	Power of Attorney in the name of the signatory of the Proposal	Lead Bidder should provide



[Handwritten signature]

3. ELIGIBILITY SCORE SHEET

Sr. No.	Criteria / Sub Criteria	Description	Point System	Max Marks
1a	Organizational Capability	<p>The Bidder/Lead Bidder's average annual financial turnover should be equal to or higher than Rs. 50 crores during the last 3 financial years (FY 2016-17, FY 2017-18, FY 2018-19 / 2019-20).</p> <p>Audited balance sheet for last three financial years should be submitted. In case the financial turnover of previous financial year 2019-20 is not finalized till the submission of bid, the provisional financial turnover for the year ending 31.03.2020 should be submitted by the bidder, in which case, the audited financials FY 31.03.2020 shall be furnished immediately when completed and no later than the date announced for award of work, if selected</p>	<p>Company Turnover(Rs.):</p> <p>1) > 50 and < 100 = 8 Marks</p> <p>2) > 100 = 15 Marks</p>	15



2a)	Project Experience	<p>The Bidder/Lead Bidder should have a single IT/ ITeS / ICT project of minimum Rs. 25 crores in the last five years which is already completed or ongoing for Central / State Government / PSU in India</p> <p>Documentary evidence for ongoing projects to be provided along with the Work Order / Contract</p>	<p>Project Value (Rs.):</p> <p>1) > 25 Crores and < 50 Crores = 5 Marks</p> <p>2) > 50 Crores and < 75 Crores = 10 Marks</p> <p>3) > 75 Crores = 15 Marks</p>	15
b)		<p>The Bidder/Lead Bidder or consortium partner should have executed / executing at least one project with a value of Rs. 25 Crores for any Central / State Government / PSU in India</p> <p>Documentary evidence for ongoing projects to be provided along with the Work Order / Contract</p>	<p>Number of Projects</p> <p>1) 1 Project = 10 Marks</p> <p>2) 2 Projects = 20 Marks</p>	20
3	Quality Certifications	<p>The Bidder/Lead Bidder or consortium partner Quality certifications</p> <p>Valid Certifications to be submitted</p>	<p>Certifications:</p> <p>1) ISO 9001 = 5 Marks</p> <p>2) ISO 9001 & ISO 27001 = 8 Marks</p> <p>3) ISO 9001, ISO 27001 and ISO 20000 = 10 Marks</p>	10

4	Demonstration	Detailed Approach and Methodology of the implementation of the project and support. System/s shall be demonstrated in Trivandrum within 1 weeks of notice, if and when required and called for minimum AI camera should be demonstrated, rest of systems should be demonstrated/ presented during evaluation.		40
Total Marks				100 Marks

Minimum 70 marks required for technical qualification.



4. VALIDITY OF THE PROPOSAL

Proposals shall remain valid for a period of 180 days (one hundred and eighty days) after the date of opening of the tender prescribed in the RFP. A Proposal valid for shorter period may be rejected as non-responsive. KELTRON may solicit the Bidder's consent to an extension of Proposal validity (but without the modification in Proposals).

5. TECHNICAL SPECIFICATIONS

5.1 SPEED ENFORCEMENT SYSTEM MODULES

Sl. No.	MODULE COMPONENTS- MINIMUM REQUIREMENTS
1	<p>Industrial Switch Module</p> <p>Industrial switch is to interconnect various subsystems of the field unit as described below.</p> <p>Minimum 10 port Ethernet switch, Industrial temperature range, built in Surge protection with TVS and GDT. Layer 2 , 10/100 Base T. 1.4Gbps or more memory</p>

	bandwidth and shared switch fabric non blocking performance. Min 1K MAC lookup table, full duplex IEEE 802.3x, 0-60 deg C
2	<p>Violation NVR Module</p> <p>NVR should be able to record all violation images with evidence camera images. These images can be downloaded from control room, for chellaning purposes. Normally SSD with SATA interface will be used for storage. NVR should be able to record all violations (ANPR lane images), & two Evidence images per violation should be recorded. 100/1000 Base T Ethernet, USB Ports, Should Support SATA support: SSD/ HDD up to 1 TB (Drive not required).Industrial temp range operation</p>
3	<p>All Vehicle ANPR – NVR Module</p> <p>NVR should be able to record all lane ANPR images in 24x7 Fashion, these images can be downloaded locally or from control room, is basically for police crime analysis applications.</p> <p>Should Support HDD up to 6TB (Drive not required), 100/1000 Base T Ethernet, USB Ports. Should capture all vehicles irrespective of Number plate state. Dual images for night capture. Industrial temp range operation.</p>
4	<p>AC Power supply and UPS Module</p> <p>AC power supply provides required DC power to all subsystems in the field box & cameras. In case of power failure Battery back option should be available for min 2hours for entire filed system.110- 270 VAC input , DC output 12VDC, minimum 300 Watts, Zero switch over time UPS, DC only operation preferred, Built in Battery charger 6 Amps with battery over voltage & under voltage protection.</p>
5	<p>AC Power Control & Power Conditioning Module</p> <p>This is a AC mains input precondition unit, for following functions</p> <p>Mains Under & over voltage protection, MOV surge protection, power control, and Over current protection.</p>
6	<p>Processor Module</p> <p>Should interface with Radar and trigger ANPR / Evidence cameras for violation capture and also for all vehicle ANPR recording. The lane & evidence cameras also should be synchronized by the Processor subsystem. It also has Local status monitoring, LAN & GSM interfaces. Features include: Flash power control, System watch dog features, NTP features, Watch dog timers, system power control, Remote Status monitoring: Temperature, battery status, Power supply working status over cloud should be possible .Camera status etc. Battery & Mains power</p>

	status monitoring is also done by the system. ARM based processor & control electronics should be provided and should interface with all subsystems and cameras as per above requirements. Interfaces: 10/100 Base T Ethernet, RS485 ports & GPIO, ADC ports. GSM – 2G interface.
7	<p>3D Radar with Radar Interface Module</p> <p>Should detect and measure speed of vehicles. Up to 240 KMPH. Speed Accuracy, 98% or better, 24GHZ operation. Multi-lane operation with Simultaneously vehicle tracking, to capture all vehicles on Road with speed & position. National / International Over speed Calibration certificate. 24 GHZ -FMCW (Frequency Modulated Continuous Wave) 3D ultra-high definition (UHD) radar Should detect and measure speed of vehicles. Up to 240 KMPH. Speed Accuracy, 98% or better, Multi lane operation with Complete unit should be IP66, from -30°C to 55°C With suitable interface to system controller over CAN/ RS 485, Isolated power supply and surge protection. 12-15VDC operation.</p>
8	<p>Lane ANPR camera</p> <p>Camera should be minimum 2 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night CMOS Global shutter sensor Exposure time maximum 1 millisecond, Interface: JPEG compression, Trigger in, Flash strobe out. External Infrared flash synchronization with Global shutter of camera.</p> <p>Lens: True Mega pixel or better, Day & night, IR corrected, lens. Motorized zoom, focus preferred.</p> <p>Camera processor Module.</p> <p>Provides interface with sensor system, Video compression JPEG. Sensor strobe, Flash strobe etc. Video processor. Ethernet, RS 485 interface. ICR control. Capability for radar / VPU external triggering, Power 12V DC nominal, 10/100 base T Ethernet Parallel or MIPI sensor interface.</p>
9	<p>Lane ANPR Camera sensor with Lens assembly Module</p> <p>2 Mega Pixel minimum, True ICR feature, Exposure time 10uS-maximum 1 millisecond, Trigger out : Global shutter sync flash strobe out, Interface::, Pixel size: 3.45 micron or better preferred, Sensor make: SONY Pregius or equivalent , Equivalent resolution mega pixel lens, motorized lens preferred, No motion blur for Vehicle speed up to 240 KMPH, Frame rate: configurable,</p>
10	<p>EVIDENCE camera:</p> <p>Camera should be minimum 2 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night, CMOS Global</p>

	<p>shutter sensor ,Exposure time maximum: 1millisecond ,JPEG compression, Trigger in, Flash strobe out</p> <p>Lens: Vari-focal, Mega pixel day & night lens, IR corrected</p> <p>Camera processor Module,</p> <p>Provides interface with sensor system, Video compression JPEG. Sensor strobe, Flash strobe etc. Video processor. Ethernet, RS 485 interface. ICR control. Colour images for day, monochrome images for night (with Infrared flash), or colour for visible flash, Power 12V DC nominal. Interface: 10/100 base T Ethernet.</p>
<p>11</p>	<p>Evidence Camera sensor with Lens assembly</p> <p>2 Mega Pixel, True ICR feature, Exposure time 10uS-maximum 1 millisecond, Trigger out : Global shutter sync flash strobe out, Interface::, Pixel size: 3.45 micron or better preferred, Sensor make: SONY Pregius or equivalent , Equivalent resolution mega pixel lens, No motion blur for Vehicle speed up to 240 KMPH, Frame rate: configurable.</p>
<p>12</p>	<p>Pulsed Power IR Flash UNIT : 250W peak power</p> <p>Infrared flash for image capture at night, Synchronized flash with global shutter of camera, Flash power sufficient to capture vehicle images also at night. Capability to capture retro reflective and non-reflective number plates. Night image quality should be sufficient to verify face of 2 wheeler drivers, helmet detection etc.</p> <p>Synchronized flash with global shutter of camera, Flash strobe input, Wavelength: 850nm, FOV: 1.3 times lane width per flash; OSRAM or similar make high efficiency LED & LENS. FOV 13 deg. Zero cycle time, 12V DC operation, pulse capability 1 millisecond, With voltage boost & Driver boards. Peak power up to 250 watts minimum.</p>
<p>13</p>	<p>4G industrial modem – Router with LAN Module</p> <p>Supports direct connectivity from control room to field & vice versa. It also supports IPV6 / IPV4 protocols. Employs LTE CAT4 module with support of up to 150Mbps downlink data transfer. Maximum upload speed is 50 Mbps</p> <p>Supports following LTE Bands</p> <ul style="list-style-type: none"> B1 (2100), B3 (1800) B7 (2600) B8 (900)



	<p>B20 (800DD)</p> <p>B5 (850)</p> <p>B38 (TDD 2600)</p> <p>B40 (TDD 2300)</p> <p>B41 (TDD 2500)</p> <p>Supports all major networks JIO, VODAFONE-IDEA, AIRTEL</p> <ul style="list-style-type: none"> • Operating Temperature Range -40 °C to 85 °C • Router employs ARM Cortex-A8 based processor running at 1GHZ • Ram 512MB DDR3L • On board Managed NAND (eMMC) 4GB • Status display includes the following parameters • Runs at 12VDC • Reset switch for factory defaults.
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5.2 OVERALL SVDS SYSTEM REQUIREMENTS

1	3D UHD Doppler Radar (1 per road)	Advanced Tracking; Doppler Radar - , Detects and measures speed of vehicles. > 240 Km/hour. Refresh Time – 50msec, Multi lane operation. Speed Accuracy better than 97%. Heavy vehicle classification (trucks / Bus etc.) should be possible by Radar.
2	Camera for License Plate Capture (1 per lane)	Camera should be minimum 2 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night. CMOS Global shutter sensor. Exposure time maximum 1millisecond. Interface: 10/100 base T Ethernet JPEG compression, Trigger in, Flash strobe out Lens: True Mega pixel or better, Day & night, IR corrected, lens. Motorized zoom, focus preferred.
3	Camera for evidence capture (1 per road)	Camera should be minimum 2 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night. CMOS

		Global shutter sensor. Exposure time maximum: 1millisecond. Interface: 10/100 base T Ethernet JPEG compression, Trigger in, Flash strobe out Lens: Vari-focal, Mega pixel day & night lens, IR corrected
4	Infrared Flash for Illumination (1 per lane)	Infrared flash for image capture at night Synchronized flash with global shutter of camera Wavelength: 850 nm, Flash power sufficient to capture vehicle images also at night. Min 250W peak power per lane. Capability to capture retro reflective and non-reflective number plates. Night image quality should be sufficient to verify face of 2 wheeler drivers, helmet detection etc. in pitch dark
5	Image brightness, contrast control	The method of gain, exposure control should give optimum image quality under all conditions, 24x7, under all conditions of illumination, independent of road orientation.
6	Vehicle image Capture, Chelan Format	Along with number plate, high quality image of vehicle, also to be captured at Day and Night for all vehicles including two wheelers. Evidence camera should capture wide angle shot of full road and surroundings with minimum two images of vehicle moving on the road. Chelan Format: 1x Lane image & 2 x Evidence images.
7	Speed Enforcement Method	Spot speed and Average speed, ANPR camera captures vehicle image / License plate number, based on trigger from Radar sensor with time stamp and speed information. Accurate time stamp synchronized with GPS or NTP servers.
8	All vehicle - ANPR capture Mode	Captures all vehicles passing through the installed location. All vehicle images and numbers including 2 wheelers are kept in data base for real time alerts / search for crime analysis. Vehicle images should be captured even if the number is not automatically detected ,(example: damaged / unreadable license

		plates or even absence of number plates)
9	ANPR accuracy	High ANPR accuracy : TYP 95% for standard plates with max one character error
10	Vehicle detection rate (percentage of vehicles captured)	High vehicle detection rate. (typical 95% of all vehicles captured under all conditions, irrespective of number plate quality, in free flow traffic conditions, systems should be installed at free traffic stretches to obtain above accuracy)
11	Front side capture	It should be possible to capture front side number plates also, instead of rear number plates. In this case, head light bloom should not affect quality of the image
12	Classification, vehicle Marking, Lane violation	Should be possible to classify heavy vehicles trucks, cars, 2 wheelers, medium heavy vehicles etc. Violated vehicles should be clearly marked by a Box on the image. Should be possible to detect Lane violation by heavy vehicles
13	Vehicle speed accuracy,	Speed measurement accuracy better than 97%, Speed > 200 KMPH. With national or international metrological calibration certificate for speed sensor.
14	Road side processing hardware and software, storage, network switch	Road side Embedded hardware, network switch etc. On site LCD display for local status monitoring. Local storage with 256GB or more storage site. Industrial grade Network switch (0-60 deg. C), 10/100 base T.
15	Power supply	Power input: 170-250VAC, UPS for road side hardware with min 3 Hr back up and also soft shutdown of Hardware in case of power failure with auto restart. Utility power supply with power meter
16	Health Monitoring and control. (from control room),	Temperature, battery status, Mains power, Power supply working status, vibration sensor (Anti tamper with siren) status, Camera status. Remote control of reset, shutdown.
17	Protection	Protection against lightning, under / over voltage



		should be provided (under these condition operation from Battery power is recommended). Low power standby mode for long period Mains power failure condition etc. Industrial grade earthing for system and poles should be provided.
18	Remote notification methods	In addition to main connectivity, Cloud based remote notification should be available

5.3 MSVDS SYSTEM MODULES BOM

SI. No.	MODULE COMPONENTS- MINIMUM REQUIREMENTS
1	<p>ANPR Camera</p> <p>Camera should be minimum 3/5 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night CMOS Global shutter sensor Exposure time maximum 1millisecond, Interface: JPEG compression, Trigger in, Flash strobe out. Lens: True Mega pixel or better, Day & night, IR corrected, lens. External Infrared flash synchronization with Global shutter of camera.</p> <p>ANPR camera processor Module.</p> <p>Provides interface with sensor system, Video compression JPEG. Sensor strobe, Flash strobe etc. Video processor. Ethernet, RS 485 interface. ICR control. Capability for radar / VPU external triggering, Colour images for day, monochrome images for night (with Infrared flash), or colour for visible flash, Power 12V DC nominal,</p>
2	<p>Lane ANPR Camera sensor with Lens Module</p> <p>3/5 Mega Pixel minimum, True ICR feature, Exposure time 10uS-maximum 1 millisecond, Trigger out : Global shutter sync flash strobe out, Interface::, Pixel size: 3.45 micron or better preferred, Sensor make: SONY Pregius or equivalent , Equivalent resolution mega pixel lens, motorized lens preferred, No motion blur for Vehicle speed up to 240 KMPH, Frame rate: configurable.</p>
3	<p>MSVDS SYSTEM CONTROLLER with Industrial Switch</p> <p>Should interface with Radar & trigger ANPR cameras for violation capture, Synchronized Flash power control, Watch dog features, RS485 & Ethernet interface. Minimum 4 port Industrial switch. Industrial temperature range. Should interface with touch panel PC for violation detection & configuration. With power control PCB & Protection</p>

<p>4</p>	<p>Pulsed Power IR Flash UNIT: 600 W peak power Infrared flash for image capture at night, Synchronized flash with global shutter of camera, Flash power sufficient to capture vehicle images also at night. Capability to capture retro reflective and non-reflective number plates. Night image quality should be sufficient to identify vehicle. Flash strobe input, Wavelength: 850nm, FOV: > 26 deg. OSRAM or similar make high efficiency LED & LENS. Zero cycle time, 12V DC operation, pulse capability 1 millisecond, With voltage boost & Driver boards. Peak power > 600 W.</p>
<p>5</p>	<p>SBC & LCD Panel USER interface Module To perform road calibration using virtual grid on image, live view of violations etc. Mobile SVDS display interface: Industrial PC with TFT LCD Display (10.5 inch). Windows or Linux operation. Celeron or quad core CPU , > 1 GHZ speed & 4GB ram.</p>
<p>6</p>	<p>4G industrial modem – Router with LAN Module Supports direct connectivity from control room to field & vice versa.. It also supports IPV6 / IPV4 protocols. Employs LTE CAT4 module with support of up to 150Mbps downlink data transfer. Maximum upload speed is 50 Mbps Supports following LTE Bands</p> <ul style="list-style-type: none"> B1 (2100), B3 (1800) B7 (2600) B8 (900) B20 (800DD) B5 (850) B38 (TDD 2600) B40 (TDD 2300) B41 (TDD 2500) <p>Supports all major networks JIO, VODAFONE, IDEA, AIRTEL</p> <ul style="list-style-type: none"> • Operating Temperature Range -40 °C to 85 °C • Router employs ARM Cortex-A8 based processor running at 1GHZ

	<ul style="list-style-type: none"> • Ram 512MB DDR3L • On board Managed NAND (eMMC) 4GB • Status display includes the following parameters • Runs at 12VDC • Reset switch for factory defaults. • IPV6 support. • DyDNS support. • Embedded Linux OS • Firmware Upgrade available • Port forwarding up to 10 ports. • Ethernet supports both IPV4 and IPV6
7	<p>3D Radar with Radar Interface Sub Module , Should detect and measure speed of vehicles. Up to 240 KMPH. Speed Accuracy, 98% or better, Multi lane operation with Simultaneously vehicle tracking, to capture all vehicles on Road with speed & position. National / international Over speed Calibration certificate. FMCW (Frequency Modulated Continuous Wave),24 GHZ3D ultra-high definition (UHD) Radar Should detect and measure speed of vehicles. Up to 240 KMPH. Speed Accuracy, 98% or better Multi lane operation with Complete unit should be IP66, from -30°C to 55°C With suitable interface to system controller over CAN/ RS 485, Isolated power supply and surge protection. 12-15VDC operation.</p>
8	MSVDS system PAN & TILT assembly and accessories

5.4 OVER ALL REQUIREMENTS OF MOBILE SPEED ENFORCEMENT SYSTEM

1	Doppler Radar	Advanced Tracking Doppler Radar - , Detects and measures speed of vehicles. > 200 Km/hour. Refresh Time – 50msec, Multi lane operation. Speed Accuracy better than 97%. Heavy vehicle classification (trucks / Bus etc.) should be possible by Radar.
2	Camera for License Plate Capture	Camera minimum 3 /5 Mega pixel total resolution, True day & night camera, min 2 lane coverage
		Colour images for day, monochrome images for night
		CMOS Global shutter sensor



		Exposure time maximum 1millisecond
		Interface: 10/100 base T Ethernet
		JPEG compression, Trigger in, Flash strobe out
		Lens: Mega pixel or better, Day & night, IR corrected, lens. Motorized zoom, focus preferred.
3	Infrared Flash for Illumination	Infrared flash for image capture at night
		Synchronized flash with global shutter of camera
		Peak pulse power > 600 watts,
		Wavelength: 850 nm, Flash power sufficient to capture vehicle images also at night. 40 deg; Angle
		Capability to capture retro reflective and non-reflective number plates.
4	Image brightness, contrast control	The method of gain, exposure control should give optimum image quality under all conditions, 24x7, under all conditions of illumination, independent of road orientation.
5	Vehicle speed accuracy,	Speed measurement accuracy better than 97%, Speed > 200 KMPH. With national or international metrological calibration certificate for speed sensor.
6	Vehicle Marking	The captured vehicle will have marking on image for identification of correct vehicle.
7	Road side processing hardware and software,	Road side Embedded hardware, Local storage with 240 GB or more storage site. Industrial grade Network switch (0-60 deg. C), 10/100 base T.
8	Local display & processor	To perform road calibration using virtual grid on image, live view of violations etc.
9	Power supply	Runs on Battery, LiFePO4, 80 AH With 15 A Charger
10	Camera mounting	Vehicle mount

5.5 RLVDS SYSTEM MODULES BOM (3 ARM 6 JUNCTIONS)

SI. No.	MODULE COMPONENTS- MINIMUM REQUIREMENTS
1	<p>Industrial Switch Module</p> <p>Industrial switch is to interconnect various subsystems of the field unit as described below. Minimum 10 port Ethernet switch, Industrial temperature range, built in Surge protection with TVS and GDT. Layer 2 , 10/100 Base T. 1.4Gbps or more memory bandwidth and shared switch fabric non blocking performance. Min 1K MAC lookup table, full duplex IEEE 802.3x, 0-60 deg C.</p>
2	<p>Violation NVR Module</p> <p>NVR should be able to record all violation images with evidence camera images. These images can be downloaded from control room, for chellaning purposes. Normally SSD with SATA interface will be used for storage. NVR should be able to record all violations (ANPR lane images)Evidence images 1 per violation should be recorded.100/1000 Base T Ethernet, USB Ports, Should Support SATA support: SSD/ HDD up to 1 TB (Drive not required).Industrial temp range.</p>
4	<p>AC Power supply and UPS Module,</p> <p>AC power-supply provides required DC power to all subsystems in the field box & cameras. I case of power failure Battery back option should be available for min 2hours for entire filed system including electronics.110- 270 VAC input , DC output 12VDC, minimum 300 Watts, Zero switch over time UPS, DC only operation preferred, Built in Battery charger 6 Amps with battery over voltage & under voltage protection.</p>
5	<p>AC Power Control & Power Conditioning Module</p> <p>This is a AC mains input precondition unit, for following functions. Mains Under & over voltage protection, MOV surge protection, power control, and Over current protection.</p>
6	<p>Processor Module</p> <p>Should interface with VPU and trigger ANPR / Evidence cameras for violation capture and also for all vehicle ANPR recording. The lane & evidence cameras also should be synchronized by the Processor subsystem. It also has Local status monitoring, LAN & GSM interfaces. Features include: Flash power control, System watch dog features, NTP features, Watch dog timers, system power control, Remote Status monitoring: Temperature, battery status, Power supply working status over cloud should be possible. Camera status etc.</p>

	<p>Battery & Mains power status monitoring is also done by the system. ARM based processor & control electronics should be provided and should interface with all subsystems and cameras as per above requirements. Interfaces: 10/100 Base T Ethernet, RS485 ports & GPIO; ADC ports. GSM – 2G interface.</p>
7	<p>VPU – virtual line crossing detection Module Should analyses Evidence camera images for Red Light violations and capture corresponding lane images and store / forward them. AI engine with GPU & Multicore CPU for Video processing. Up to 2.1GHz, 192 GPU cores, Quad core CPU, 2 GB ram, 16 GB flash, USB, Gigabit Ethernet.,</p>
8	<p>Lane ANPR camera Camera should be minimum 2 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night CMOS Global shutter sensor Exposure time maximum 1millisecond, Interface: JPEG compression, Trigger in, Flash strobe out. External Infrared flash synchronization with Global shutter of camera. True Mega pixel or better, Day & night, IR corrected, lens. Motorized zoom, focus preferred. Camera processor Module. Provides interface with sensor system, Video compression JPEG. Sensor strobe, Flash strobe etc. Video processor. Ethernet, RS 485 interface. ICR control. Capability for radar / VPU external triggering, Power:12V DC nominal, 10/100 base T Ethernet. Parallel or MIPI sensor interface.</p>
9.	<p>Lane ANPR Camera sensor with Lens assembly Module 2 Mega Pixel minimum, True ICR feature, Exposure time 10uS-maximum 1 millisecond, Trigger out : Global shutter sync flash strobe out, Interface:., Pixel size: 3.45 micron or better preferred, Sensor make: SONY Pregius or equivalent , Equivalent resolution mega pixel lens, motorized lens preferred, No motion blur for Vehicle speed up to 180 KMPH, Frame rate: configurable,</p>
10	<p>EVIDENCE CAMERA: Camera should be minimum 2 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night, CMOS Global shutter sensor, Exposure time maximum: 1millisecond, JPEG compression, Trigger in, Flash strobe out. Lens: Vari-focal, Mega pixel day & night lens, IR corrected. Camera processor Module Provides interface with sensor system, Video compression JPEG. Sensor</p>

	strobe, Flash strobe etc. Video processor. Ethernet, RS 485 interface. ICR control. Colour images for day, monochrome images for night (with Infrared flash), or colour for visible flash, Power 12V DC nominal. Interface: 10/100 base T Ethernet:
11	Evidence Camera sensor with Lens assembly Module 2 Mega Pixel, True ICR feature, Exposure time 10uS-maximum 1 millisecond, Trigger out : Global shutter sync flash strobe out, Interface:., Pixel size: 3.45 micron or better preferred, Sensor make: SONY Pregius or equivalent , Equivalent resolution mega pixel lens, No motion blur for Vehicle speed up to 240 KMPH, Frame rate: configurable,
12	Pulsed Power IR Flash UNIT : 250W peak power Infrared flash for image capture at night, Synchronized flash with global shutter of camera, Flash power sufficient to capture vehicle images also at night. Capability to capture retro reflective and non-reflective number plates. Night image quality should be sufficient to verify face of 2 wheeler drivers, helmet detection. Synchronized flash with global shutter of camera, Flash strobe input, Wavelength: 850nm, FOV: 1.3 times lane width per flash, Flash power sufficient to capture high quality vehicle images also at night. OSRAM or similar make high efficiency LED & LENS. FOV 13 deg. Zero cycle time, 12V DC operation, pulse capability 1 millisecond, With voltage boost & Driver boards. Peak power up to 250 watts minimum. सत्यमेव जयते

5.6 OVER ALL REQUIREMENTS OF MOBILE SPEED ENFORCEMENT SYSTEM

1	Camera for License Plate Capture (1 per lane)	ANPR 2 Mega pixel camera (True day and night): one per lane to be used to capture all vehicles including 2.wheelers, violating RED signal and stop line in day and night conditions. All types of number plates reflective type and standard type should be captured. Vehicle image also should be captured under all conditions. Image compression JPEG. Connectivity Ethernet. Camera should be minimum 2 Mega pixel total resolution, True day & night camera, Color images for day, monochrome images for night, CMOS Global shutter sensor. Exposure time maximum 1millisecond Interface: 10/100 base T Ethernet. JPEG compression, Trigger in, Flash strobe out. True Mega pixel or better, Day & night, IR corrected, lens. Motorized zoom, focus preferred.
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2	Camera for evidence capture (1 per road)	ANPR Mega pixel camera (True day and night): one per Road to capture in wide angle image of violation with violating vehicle and Traffic signal. Image compression JPEG. Connectivity Ethernet. Should work for day and night condition, acting as court evidence with red traffic light. Camera should be minimum 2 Mega pixel total resolution, True day & night camera Color images for day, monochrome images for night CMOS Global shutter sensor Exposure time maximum 1millisecond Interface: 10/100 base T Ethernet JPEG compression, Trigger in, Flash strobe out
3	Vehicle sensing, Vehicle Marking,	Vision based sensor for red light jumping & stop line violation detection. System should be able to detect vehicles with no number plates or damaged plates also. Violating vehicle should be marked on both lane & evidence images by a box or similar identifier. Minimum 4 type vehicle classification should be possible. Chelan Format should have 1x lane image & 1 x Evidence image
4	Infrared Flash for illumination (1 per lane)	Infrared flash for image capture at night. Flash power sufficient to capture vehicle images also at night. Should be capable of capturing all types of number plates, including two wheelers at night. Min 250W peak power per lane. Capability to capture retro reflective and non-reflective number plates
5	ANPR (automatic number plate recognition) accuracy	High ANPR accuracy: TYP 95% for standard plates with max one character error.
6	Traffic light interface / visibility	Optically isolated interface. Red signal light should be visible in the evidence camera image along with image of violating vehicle for Day and Night.
7	Road side processing hardware and software	As required



8	Power supply	Power input: 170-240VAC, UPS for road side hardware with min 3 Hr back up, Utility power supply with power meter required at site meeting State electricity board requirements)
9	Protection	Protection against lightning, under / over voltage should be provided (under these condition operation from Battery power is recommended).
10	Camera mounting	Suitable Cantilever / gantry should be provided.

5.7 AI SMART CAMERA MODULES FOR 3 MEGA PIXEL CAMERA

Sl. No.	MODULE COMPONENTS - AI SMART CAMERA (3 MEGA PIXEL)
1	<p>CAMERA 3 MEGA PIXEL</p> <p>Camera should be minimum 3 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night CMOS Global shutter sensor Exposure time maximum 1millisecond, Interface: JPEG compression, Trigger in, Flash strobe out. Lens: True Mega pixel or better, Day & night, IR corrected, lens. External Infrared flash synchronization with Global shutter of camera.</p> <p>Lane ANPR camera processor Module.</p> <p>Provides interface with sensor system, Video compression JPEG. Sensor strobe, Flash strobe etc. Video processor. Ethernet, RS 485 interface. ICR control. Capability for radar / VPU external triggering, , or colour for visible flash, Power 12V DC nominal,</p>
2	<p>Lane ANPR Camera sensor with Lens assembly</p> <p>3 Mega Pixel minimum, True ICR feature, Exposure time 10uS-maximum 1 millisecond, Trigger out : Global shutter sync flash strobe out, Interface::, Pixel size: 3.45 micron or better preferred, Sensor make: SONY Pregius or equivalent , Equivalent resolution mega pixel lens, No motion blur for Vehicle speed up to 200 KMPH, Frame rate: configurable.</p>
3	<p>VPU SUB SYSTEM MODULE</p> <p>VPU subsystem is an AI engine to get images form camera and analyse same with deep learning algorithms to perform helmet detection, seatbelt, triple riding detection etc.</p> <p>Violation detected images are locally storied on a SSD with required meta</p>

	<p>data. These violation images will be later transmitted to control room for chellan processing. This Subsystem also will have required network switched, power supply, solar operation with maximum power point tracking, flash interface etc. Remote monitoring of system also should be possible over cloud.</p> <p>AI engine with min 128 Cores GPU and Multicore CPU, ARM® Cortex® - A57 Core (Quad-Core) L1 Cache: 48KB L1 instruction cache (I-cache) per core; 32KB L1 data cache (D-cache) per core L2 Unified Cache: 2MB </p> <p>Maximum Operating Frequency: 1.43GHz 4GB min RAM, with Storage interface.1000 Base T Ethernet, HDMI & USB ports.</p> <p>Industrial Ethernet Switch, Minimum 4port Ethernet switch, Industrial temperature range, built in Surge protection. Layer 2, 10/100 Base T. 1.4Gbps or more memory bandwidth and shared switch fabric non-blocking performance.</p> <p>Power path-MPPT controller: for solar Charging of up to 80AH battery, 24V solar interface, Battery protection and monitoring of Power system, VPU sub system etc. OR LiFePO4 Battery charger sub systems with protection for Mains powered applications.</p>
<p>4</p>	<p>Pulsed Power IR Flash UNIT : 600 W peak power</p> <p>Infrared flash for image capture at night, Synchronized flash with global shutter of camera, Flash power sufficient to capture vehicle images also at night. Capability to capture retro reflective and non-reflective number plates. Night image quality should be sufficient to verify face of 2 wheeler drivers, helmet detection. Flash strobe input, Wavelength: 850nm, FOV: 26 deg. OSRAM or similar make high efficiency LED & LENS. Zero cycle time, 12V DC operation, pulse capability 1 millisecond, With voltage boost & Driver boards. Peak power > 600W.</p>
<p>5</p>	<p>4G industrial modem – Router with LAN Module</p> <p>Supports direct connectivity from control room to field. It also supports IPV6 / IPV4 protocols.</p> <ul style="list-style-type: none"> • Employs LTE CAT4 module with support of up to 150Mbps downlink data transfer. • Maximum upload speed is 50 Mbps • Supports following LTE Bands

	<p>B1 (2100)</p> <p>B3 (1800)</p> <p>B7 (2600)</p> <p>B8 (900)</p> <p>B20 (800DD)</p> <p>B5 (850)</p> <p>B38 (TDD 2600)</p> <p>B40 (TDD 2300)</p> <p>B41 (TDD 2500)</p> <ul style="list-style-type: none"> • Supports all major networks JIO, VODAFONE-IDEA, AIRTEL • Operating Temperature Range -40 °C to 85 °C • Router employs ARM Cortex-A8 based processor running at 1GHZ • Ram 512MB DDR3L • On board Managed NAND (eMMC) 4GB • Status display includes the following parameters • Runs at 12VDC • Reset switch for factory defaults. • IPV6 support. • DyDNS support. • Embedded Linux OS • Firmware Upgrade available • Port forwarding up to 10 ports. • Ethernet supports both IPV4 and IPV6
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5.8 AI SMART CAMERA MODULES FOR 5 MEGA PIXEL CAMERA

Sl. No.	MODULE COMPONENTS - AI SMART CAMERA (5 MEGA PIXEL)
1	<p>CAMERA REQUIREMENTS:</p> <p>Camera should be minimum 5 Mega pixel total resolution, True day & night camera. Colour images for day, monochrome images for night CMOS Global</p>

	<p>shutter sensor Exposure time maximum 1millisecond, Interface: JPEG compression, Trigger in, Flash strobe out. Lens: True Mega pixel or better, Day & night, IR corrected, lens. External Infrared flash synchronization with Global shutter of camera.</p> <p>Lane ANPR camera processor Module.</p> <p>Provides interface with sensor system, Video compression JPEG. Sensor strobe, Flash strobe etc. Video processor. Ethernet, RS 485 interface. ICR control. Capability for radar / VPU external triggering, , or colour for visible flash, Power 12V DC nominal,</p>
<p>2</p>	<p>Lane ANPR Camera sensor with Lens assembly</p> <p>5 Mega Pixel minimum, True ICR feature, Exposure time 10uS-maximum 1 millisecond, Trigger out : Global shutter sync flash strobe out, Interface:., Pixel size: 3.45 micron or better preferred, Sensor make: SONY Pregius or equivalent , Equivalent resolution mega pixel lens, No motion blur for Vehicle speed up to 200 KMPH, Frame rate: configurable.</p>
<p>3</p>	<p>VPU SUB SYSTEM MDULE</p> <p>VPU subsystem is an AI engine to get images form camera and analyse same with deep learning algorithms to perform helmet detection, seatbelt, triple riding detection etc.</p> <p>Violation detected images are locally storied on a SSD with required meta data. These violation images will be later transmitted to control room for chellan processing.</p> <p>This Subsystem also will have required network switched, power supply, solar operation with maximum power point tracking, flash interface etc. Remote monitoring of system also should be possible over cloud.</p> <p>AI engine with min 128 Cores GPU and Multicore CPU, ARM® Cortex® - A57 Core (Quad-Core) L1 Cache: 48KB L1 instruction cache (I-cache) per core; 32KB L1 data cache (D-cache) per core L2 Unified Cache: 2MB </p> <p>Maximum Operating Frequency: 1.43GHz 4GB min RAM, with Storage interface.1000 Base T Ethernet, HDMI & USB ports.</p> <p>Industrial Ethernet Switch, Minimum 4port Ethernet switch, Industrial temperature rangè, built in Surge protection. Layer 2, 10/100 Base T. 1.4Gbps or more memory bandwidth and shared switch fabric non-blocking performance. Power path-MPPT controller: for solar Charging of up to 80AH battery, 24V solar interface, Battery protection and monitoring of Power system, VPU sub system etc. OR LiFePO4 Battery charger sub systems with</p>

	protection for Mains powered applications.
4	<p>PULSED POWER IR FLASH UNIT : 600W PEAK POWER</p> <p>Infrared flash for image capture at night, Synchronized flash with global shutter of camera, Flash power sufficient to capture vehicle images also at night. To capture retro reflective and non-reflective number plates. Night image quality should be sufficient to verify face of 2 wheeler drivers, helmet detection.</p> <p>Flash strobe input, Wavelength: 850nm, FOV: 26 deg. OSRAM or similar make high efficiency LED & LENS. Zero cycle time, 12V DC operation, pulse capability 1 millisecond, With voltage boost & Driver boards. Peak power up to 600W.</p>
5	<p>4G INDUSTRIAL MODEM – ROUTER WITH LAN MODULE</p> <p>Supports direct connectivity from control room to field. It also supports IPV6 / IPV4 protocols.</p> <ul style="list-style-type: none">• Employs LTE CAT4 module with support of up to 150Mbps downlink data transfer.• Maximum upload speed is 50 Mbps• Supports following LTE Bands<ul style="list-style-type: none">B1 (2100)B3 (1800)B7 (2600)B8 (900)B20 (800DD)B5 (850)B38 (TDD 2600)B40 (TDD 2300)B41 (TDD 2500)• Supports all major networks JIO, VODAFONE-IDEA, AIRTEL• Operating Temperature Range -40 °C to 85 °C• Router employs ARM Cortex-A8 based processor running at 1GHZ• Ram 512MB DDR3L



	<ul style="list-style-type: none"> • On board Managed NAND (eMMC) 4GB • Status display includes the following parameters • Runs at 12VDC • Reset switch for factory defaults. • IPV6 support. • DyDNS support. • Embedded Linux OS • Firmware Upgrade available • Port forwarding up to 10 ports. • Ethernet supports both IPV4 and IPV6
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5.9 AI SMART CAMERA MODULES FOR PARKING VIOLATION DETECTION.

SI. No.	MODULE COMPONENTS - AI SMART CAMERA: PARKING VIOLATION
1	<p>PTZ-IR camera is to be used, to change FOV to different pre-set zones on the road and capture parking violations. PTZ camera should have built in IR illuminator for night operation. 1080p60 fps • 30xZoom• 150M/250M IR •Smart IRII • IP66• IK10• NEMA 4X• -50°C ~ 55°C; Vari-Angle IR provides smooth vari-angle adjustment of the IR illuminators, allowing broad coverage FOV and highly uniform IR intensity while avoiding hot- spots traditionally associated with IR illumination.; Real-time H.265, H.264 and MJPEG Compression (Triple Codec) •60 fps @ 1080p Full HD. Pan /tilt speed upto 300 deg/S. 128 presets</p>
2	<p>VPU SUB SYSTEM MODULE</p> <p>VPU subsystem is an AI engine to get images form camera and analyse same with deep learning algorithms to perform vehicle detection for parking violation. Violation detected images are locally storied on a SSD with required meta data. These violation images will be later transmitted to control room for chellan processing. This Subsystem also will have required network switched, power supply, solar operation with maximum power point tracking, flash interface etc. Remote monitoring of system also should be possible over cloud.</p> <p>AI ENGINE WITH MIN 128 CORES GPU AND MULTICORE CPU, ARM @ CORTEX ® -A57 MPCORE (QUAD-CORE) L1 CACHE: 48KB L1 INSTRUCTION CACHE (I-CACHE) PER CORE; 32KB L1 DATA CACHE (D-CACHE) PER CORE L2 UNIFIED CACHE: 2MB </p>

	<p>MAXIMUM OPERATING FREQUENCY: 1.43GHZ 4GB MIN RAM, WITH STORAGE INTERFACE.</p> <p>1000 BASE T ETHERNET, HDMI & USB PORTS.</p> <p>Industrial Ethernet Switch, Minimum 4port Ethernet switch, Industrial temperature range, built in Surge protection. Layer 2, 10/100 Base T. 1.4Gbps or more memory bandwidth and shared switch fabric non-blocking performance. Power path controller: LiFePO4 Battery charger sub systems with protection for Mains Powered applications.</p>
<p>3</p>	<p>4G INDUSTRIAL MODEM – ROUTER WITH LAN MODULE</p> <p>Supports direct connectivity from control room to field. It also supports IPV6 / IPV4 protocols.</p> <ul style="list-style-type: none"> • Employs LTE CAT4 module with support of up to 150Mbps downlink data transfer. • Maximum upload speed is 50 Mbps • Supports following LTE Bands <ul style="list-style-type: none"> B1 (2100) B3 (1800) B7 (2600) B8 (900) B20 (800DD) B5 (850) B38 (TDD 2600) B40 (TDD 2300) B41 (TDD 2500) • Supports all major networks JIO, VODAFONE-IDEA, AIRTEL • Operating Temperature Range -40 °C to 85 °C • Router employs ARM Cortex-A8 based processor running at 1GHZ • Ram 512MB DDR3L • On board Managed NAND (eMMC) 4GB

	<ul style="list-style-type: none"> • Status display includes the following parameters • Runs at 12VDC • Reset switch for factory defaults. • IPV6 support. • DyDNS support. • Embedded Linux OS • Firmware Upgrade available • Port forwarding up to 10 ports. • Ethernet supports both IPV4 and IPV6
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5.10 AI - ANPR SMART CAMERA GENERAL REQUIREMENTS

<p>ANPR Camera Specification</p>	<p>Resolution: 3/5 Mega pixel; / PTZ camera Color images for day, monochrome images for night, True ICR feature CMOS Global shutter sensor Exposure time 10uS-maximum 1 millisecond Trigger out : Global shutter sync flash strobe out Interface: Ethernet, RS 485 Lux sensor for Exposure control Video compression: JPEG Sensor: Sony pregius sensor, or equivalent, Pixel size: 3.45 micron minimum Equivalent resolution mega pixel lens Vehicle speed up to 180 KMPH Frame rate: configurable Minimum illumination: zero with synchronized pulsed IR flash Capability for radar triggering Power 12V DC nominal</p>
<p>IR illuminator Specification</p>	<p>Infrared flash for image capture at night Synchronized flash with global shutter of camera Power in 12V, built in 48 V boost voltage converter Flash strobe input</p>

	<p>Wavelength: 850nm, FOV: 26 deg depending on number of lanes Flash power sufficient to capture vehicle images also at night. Capability to capture retro reflective and non-reflective number plates. Peak power up to 600 watts</p>	
AI- Visual Processing Unit Specification	Processor	At least 64-bit Quad Core, SIMD ISA capable: SSE4+/NEON CPU with operating freq >= 1GHz, (additional good to have: CUDA-based or TPU or Myriad X based dedicated hardware accelerator for vector ops)
	RAM	At least 4GB
	Networking	10/100 MBPS (Gigabit Ethernet,), 4G
	Storage	On-board flash/eMMC or MicroSD (at least 16 GB in total, MicroSD IO, at least 98mbps)
	USB Ports	At least 2 USB2.0 or USB3.0 ports
	GPU	Must support OpenGL ES 2.0 at least 24 GFLOPS, with at least 1080p30 H.264/MPEG-4 AVC high-profile decoder and encoder
	Additional Storage features	Expandable Storage (through MicroSD / SSD up to 128GB), Anti-tamper with siren shall be part of systems
	OS	Linux
Solar Power system	Input	

	Operating voltage	24 Vdc nominal
	Panel power	250 Watts min.
	Panel V-MPPT	30 VDC typ.
	M PPT converter efficiency	95 %
	Battery	80 Ah, Li FE PO4, 12VDC nominal.
	Output	
	Output voltage	12 VDC nominal
	Protection	
	Battery over Charge , under voltage, short circuit	Yes
	Backup duration	24 Hours
DC UPS (For Mains powered only use cases only)	<ul style="list-style-type: none"> • AC side over, under voltage protection, surge protection • DC power supply - industrial (up to 150 W) • DC UPS with 5A charged with Battery protection (over/under) & zero sec change over • output = 10.5-14 VDC: 5V DC out • Battery: 40 AH 	
Parking lot system	<ul style="list-style-type: none"> • Min 2 Mega pixel PTZ-IR camera is to be used, to change FOV to different pre-set zones on the road and capture parking violations 	
Enclosure	<ul style="list-style-type: none"> • Pole mounted outdoor type, with rugged, with Rain canopy etc. All connectors, cables etc. Shall be of industrial grade and any hardware, shall be easily replaceable 	
Connectivity	<ul style="list-style-type: none"> • 4G 	

5.11 CENTRAL CONTROL ROOM IT COMPONENTS MINIMUM SPECIFICATION

1. RACK SERVER: DELL/HP/CISCO

	Should support Hot Pluggable & Redundant Management
	Modules with onboard KVM functionality.
	Should provide detailed technical information.
	Vendor should be registered in Gartner Leader magic quadrant for Server

	Minimum 1RU rack mounted form factor
Power	Should offer a Dual phase power subsystem
Processor	For each Server:
	a) 2 Socket processor required b) Intel family: Latest generation, 64 Bit processor, E5-2690 V4 and above with at least 8 cores and above, minimum 2.1 GHz or above , with 11MB Cache or above
Memory	Each with at least 64 GB DDR4 expandable up to 1.5 TB
Hard disk drive	3x 1.2TB SAS 12G Enterprise 10K SFF SAS internal Hot swappable HDD in each server. , compatible with OS mentioned under specs, expansion options and matching configuration with infrastructure. Minimum 2 I/O slots, with 2 port 8/16 Gb/s Fiber or equivalent channel with RAID 5 installation.
Storage Controller	Integrated PCIe 3.0 based SAS Raid Controller with RAID 5 Support
Networking Interface	Minimum 2x10G interface with SR 10G transceivers and 2x1/10G interface with 1G transceivers
Interfaces	Minimum of 4 * internal USB 3.0 port
Bus Slots	Minimum of 3Nos of PCIe 3.0 based mezzanine slots. One PCIe x16 based and one PCIe x8 based supporting Ethernet, FC adapters, Infini Band and SAS based adapters
Graphics Memory capacity	Upto 16 MB
Supply of OS and support	Support of following OS: Win Server 2016 R2 (64 bit) Red Hat Enterprise Linux 6.x (64 bit), Suse Enterprise Linux v11, Oracle Linux
Virtualization software and Support	The virtualization software shall be licensed for the entire server.
Warranty	5 years
Provisioning	Essential tools, drivers, agents to setup, deploy and maintain the server should be embedded inside the server. There should be a built -in Update manager that can update firmware of system by connecting online.

<p>Remote Management</p>	<p>System remote management should support browser based graphical remote console along with virtual power button, remote boot using USB/ iCD/ DVD Drive. It should be capable of offering upgrade, of software and patches from a remote client using media/ iimage/ folder. It should support server power capping and historical reporting and should have support for multifactor authentication. Server should support automated firmware update. Server should support agent less management using the out-of-band remote management port.</p>
	<p>The server should support Active monitoring of System Health and record changes in the server hardware and system configuration. It assists in diagnosing problems and delivering rapid resolution when system failures occur. Should support remote console sharing up to 2 or more users simultaneously during pre-OS and OS runtime operation. Full Remote management should be available over the browser. It should support encrypted Microsoft Terminal Services Integration.</p>
<p>Server management</p>	<p>Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should support automatic event handling that allows configuring policies to notify failures via e-mail, or SMS gateway or automatic execution of scripts.</p> <p>Should support scheduled execution of OS commands, batch files, scripts, and command line apps on remote nodes</p> <p>Should be able to perform comprehensive system data collection and enable users to quickly produce detailed reports for managed devices. Should support the reports to be saved in HTML, CSV or XML format.</p> <p>Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/ firmware components. The Server Management Software should be of the same brand as of the server supplier.</p>
<p>Administrator Dashboard</p>	<p>Software should support certain kind of dashboard view to quickly scan the managed resources to assess the overall</p>



	health of the server. The Dashboard should preferably display a health summary of the following:
	Server Profiles
	Server Hardware
	Enclosures
	Logical Interconnects
	Appliance alerts
	The status of each resource should be indicated. .
Firmware management	Software should support firmware management for the managed devices centrally by offering baseline firmware version to keep the systems on supported version of firmware.
	Software should maintain firmware repository to download firmware from website and update on managed nodes when required.

2. STORAGE:DELL/HP/CISCO/JUNIPER

OPERATING SYSTEM & CLUSTERING SUPPORT	The storage array should support industry-leading Operating System platforms including: <i>Windows 2012, HPE-UX, VMware and Linux.</i> Offered Storage Shall support all above operating systems in Clustering.
CAPACITY & SCALABILITY	The Storage Array shall be offered with 48TB x5 with RAID 1+0/ RAID 6 For effective power saving, Storage shall be supplied with 2.5" Small form factor SFF drives however storage subsystem shall also support LFF drives with the addition of required disk enclosures. Storage shall be scalable to minimum of 180 number of drives or greater than 160TB using 900GB SFF SAS drives.
FRONT-END PORTS	Offered Storage system shall be supplied with minimum of Dual 16Gbps FC ports and Dual 10Gbps ISCSI ports per controller. Offered storage shall have flexibility to use all above ports either as FC or ISCSI by replacing the requisite SFP. Vendors shall provide the additional SFP accordingly. In case, vendor doesn't support this feature, then every controller shall be


	populated upfront with 4 x 16Gbps FC ports and 4 x 10Gbps iSCSI ports.
BACK-END	Offered Storage subsystem back-end engine shall be running on latest SAS (6Gbps) loop speed.
ARCHITECTURE	The storage array should support dual, redundant, hot-pluggable, active-active array controllers for high performance and reliability
NO SINGLE POINT OF FAILURE	Offered Storage Array shall be configurable in a No Single Point of configuration including Array Controller card, Cache memory, FAN, Power supply etc.
DISK DRIVE SUPPORT	For SFF drives, Offered Storage Array shall support minimum 300/600/900/1200 GB hot-pluggable Enterprise SFF SAS hard drives, 400/800/1600/3200GB SSD along with SAS MDL 1TB / 2TB drives. 2. For LFF drives, offered Storage Array shall support minimum of 4TB / 6TB / 8TB SAS MDL drives. 3. Offered storage array shall also have support for self-encrypted SAS and SAS MDL drives.
CACHE	Offered Storage Array shall be given with Minimum of 4GB cache per controller in a single unit after removing the operating system overhead. Cache shall be backed up in case of power failure for indefinite time either using batteries or capacitors or any other equivalent technology. Offered Storage shall also have optional support for Flash cache using SSD / Flash drives. Offered storage shall support at-least 2TB Flash Cache. Offered storage shall have at-least 2GB additional cache per controller for Metadata and System OS. Vendor shall clearly provide the document about the overall cache requirement for Metadata and System OS
RAID SUPPORT	Offered Storage Subsystem shall support Raid 0, 1, 1+0 and Raid 6 with Dual Parity Protection
POINT IN TIME AND CLONE COPY	Offered Storage array shall be configured with array based Snapshot and clone functionality and shall be configured for minimum of 512 snapshot licenses. Offered Storage array shall support at-least 512 point in time

	copies (Snapshots).
REPLICATION	Offered storage subsystem shall support storage based replication to DR location.
VIRTUALIZATION AND THIN PROVISIONING	Offered storage shall be offered and configured with virtualization capability so that a given volume can be striped across all spindles of given drive type. Offered Storage shall be offered and configured with Thin Provisioning capability.
DATA TIERING	Offered Storage shall also have optional support for Sub-Lun Data tiring in real time fashion across different type of drives within a given pool like SSD, SAS, NL-SAS etc.
GLOBAL DEDICATED SPARE AND HOT	Offered Storage Array shall support Global hot Spare for offered Disk drives. At least 2 Global hot spare drive shall be configured for every 30 drives. Storage subsystem shall also have the flexibility to assign dedicated spare for raid sets.
LOGICAL VOLUME & PERFORMANCE	Storage Subsystem shall support minimum of 512 Logical Units. Storage Array shall also support creation of more than 100TB volume at controller level. Offered Storage shall have inbuilt performance management software. Configuration Dashboard shall show overall IOPS and MB/sec performance
LOAD BALANCING & MUTI-PATH	Multi-path and load balancing software shall be provided, if vendor does not support MPIO functionality of Operating system.
Warranty	5year Warranty with 24X7,NBD replacement support

3. TAPE DRIVE & BACKUP SOFTWARE: DELL/HP

DRIVE TECHNOLOGY SUPPORTED	LTO-8 LTO-7
NUMBER OF DRIVES	2
CAPACITY	720TB (LTO-8, 24 slots)
DATA TRANSFER	2.16 TB/hr (2 LTO-8 drives)
DRIVE INTERFACE	8 Gb Native Fibre Channel 6 Gb/sec SAS

56



<p>FEATURES</p>	<p>It should have Exceptional storage density: 720 TB, 1.44 PB with (2.5:1 compression) using LTO-8 tape cartridges. Should be Easy-to-use web-based remote management It should have Integrated bar code reader It should have Tool-free tape drive upgrades Ut should have Leverage tape drives It should have Customer upgradeable redundant power supply It should have Multiple interface choices available (FC or SAS) It should have Removable magazines with user-configurable mail slots It should be Easy-to-enable AES 256-bit embedded hardware encryption with compression It should have Extensive OS and software compatibility testing It should be Proactively monitor utilization, operational performance, and overall life and health of the drives and media with Tape Assure Advanced.</p>
<p>SUPPORT AND WARRANTY</p>	<p>Provides end-to-end management of your backup integration process. Professional backup and recovery planning that aligns with customer's business needs and implementation that reduces project execution time and risk to the storage environment.</p>
<p>DATA RATE MATCHING</p>	<p>It should optimizes performance and maximizes overall efficiency, allowing the drive to respond immediately to any data speed changes from the host. It should minimizes rewinding and repositioning of the tape, significantly reducing physical wear and increasing reliability. It should minimizes the power requirements for the drive by reducing the number of repositions</p>
<p>RELIABILITY</p>	<p>With a rating of 2,000,000 robot load/unload cycles, the Tape Libraries should provide necessary high reliability for today's demanding environment. To improve reliability and longevity, Ultrium products feature Data Rate Matching (DRM). This allows the tape drive to dynamically and continuously adjust the speed of the drive, to match the speed of the host or network. This increases performance,</p>



	reduces mechanical wear on the tape drive and extends tape life.
BACKUP	<p>It should be Fast and reliable backup and recovery</p> <p>It should meet organization's data protection expectations by reducing the time it takes to back up and recover critical information; apps and servers</p> <p>Advanced integration with Vmware and Hyper-V.</p> <p>It should minimize backup windows, decrease network traffic and reduce disk space required for storing backup data.</p> <p>It should also reduces the total cost of ownership (TCO) with comprehensive dedupe to cloud that can save storage and infrastructure cost.</p> <p>It should easily integrated with Vmware, Microsoft and Linux platforms</p>

4. DESKTOPS: DELL/HP/ACER

PROCESSOR	- Core i5, latest GEN, > 4 core
RAM	- RAM – 8GB, DDR4, 2400MHz
HARD DRIVE	- Min. 1 TB 7200 RPM hard drive, 256 GB SSD Hard drive
OPERATING SYSTEM	- Windows 10 Prof
GRAPHICS CARD	- Dual Display support
Screen	- 23" widescreen LCD/LED Monitor, HDMI/DVI Support
WARRANTY	- 5 year warranty

5. ANPR DESKTOP PC'S: DELL/HP/ACER

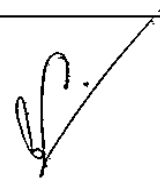
PROCESSOR	- Core i7, latest GEN, > 4 core
RAM	- RAM – 8GB, DDR4, 2400MHz
HARD DRIVE	- Min. 256 GB SSD
OPERATING SYSTEM	- Linux Ubuntu
GRAPHICS CARD	- 1660 GTX or better
Screen	- 23" widescreen LCD/LED Monitor, HDMI/DVI Support
WARRANTY	- 5 year warranty

6. SAN SWITCH: CISCO/HP/DELL

<p>DRIVE TECHNOLOGY SUPPORTED</p>	<p>Rack Mount SAN Switch, 24 Ports 16Gbps FC Switch with 12 Ports active along with SFP's, upgradable to 24 ports via ports on demand license. ports should be auto-sensing at 8 and 16Gb/s Total Min bandwidth 192 Gbps, Redundant power supply</p>
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7. CORE SWITCH: CISCO/HP/DELL

<p>I/O PORTS AND SLOTS</p>	<p>The above Switch should be scalable to provide 40G SFP+ uplink. Should support combination of converged ports and SFP+/10GBASE-T. Should have 1 RJ-45 out-of-band management port. Shall have USB support to copy switch files to/from an USB flash drive should have min 32 ports</p>
<p>LAYER 3 ROUTING</p>	<p>Should support both Ipv4 and Ipv6 IP addressing and protocol. RIPv1 and RIPv2 routing OSPF (Ipv4) and OSPFv3 (Ipv6) Border Gateway Protocol (BGP) and Policy-based routing Shall include Equal-cost Multipath (ECMP) capability Multicast routing – PIM Sparse and PIM Dense modes All Features should support day 1 itself</p>
<p>DUAL FLASH IMAGES</p>	<p>Provides independent primary and secondary operating system files for backup while upgrading Multiple configuration files to allow multiple configuration files to be stored to a flash image</p>
<p>RESILIENCY</p>	<p>Hitless patch upgrade. Ultrafast protocol convergence (<50 ms) with BFD or equivalent.</p>
<p>HIGH-PERFORMANCE SWITCHING</p>	<p>Switch need to have non-blocking architecture.</p>
<p>REVERSIBLE AIRFLOW</p>	<p>Enhanced for data center hot-cold aisle deployment with reversible airflow—for either front-to-back or back-to-front airflow</p>
<p>STACKING</p>	<p>Should support of stacking of switches</p>
<p>JUMBO FRAMES</p>	<p>Support With frame sizes of up to 10,000 bytes</p>
<p>QUALITY OF SERVICE</p>	<p>Quality of service with advanced traffic management capabilities</p>



(QOS)	
PACKET FILTERING AND REMARKING	Source-port filtering or equivalent feature to allow only specified ports to communicate with each other
TRAFFIC PRIORITIZATION	Traffic prioritization based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, DiffServ etc
SECURITY	IEEE 802.1x to provide port-based user authentication with multiple 802.1x authentication sessions per port Media access control (MAC) authentication to provide simple authentication based on a user's MAC address Web-based authentication to provide a browser-based environment to authenticate clients that do not support the IEEE 802.1X supplicant
DYNAMIC ARP PROTECTION	Dynamic ARP protection blocking ARP broadcasts from unauthorized hosts
POWER SUPPLIES & FAN SLOT	Should have redundant power supply and fan slots-populated on day 1
PROCESSOR	Switch should have packet buffer size of 16 MB
MAC-BASED VLAN	Should support Mac based VLAN
VLAN SUPPORT	Provides support for 4,096 VLANs
PERFORMANCE	Support 280K MAC addresses. Throughput of 1000 Mpps or better. Routing and Switching capacity of 1400 Gbps or better. Shall provide Gigabit (1000 Mb) Latency of < 4 μs and 10 Gbps Latency of < 3 μs.
ENVIRONMENT	Operating temperature 32°F to 113°F (0°C to 45°C) Operating relative humidity 10% to 90%, noncondensing
SAFETY & ELECTRICAL CHARACTERISTICS	Shall support IEEE 802.3az Energy-efficient Ethernet (EEE) to reduce power consumption Safety and Emission standards including EN 60950; IEC 60950; VCCI Class A; FCC part 15 Class Should support OpenFlow for investment protection and SDN environments.
RADIUS/TACACS+	RADIUS/TACACS+ for switch security access administration.
WARRANTY & SOFTWARE UPGRADE	5Years warranty with advance replacement and next-business-day delivery

	Software upgrades/updates shall be included as part of the warranty.
RACK SIZE	Switch must have 19" 1U form factor.

8. 10G SFP+ SINGLE MODE TRANSCEIVERS

TRANSMIT POWER	-8.2 to +0.5
RECEIVE POWER	-14.4 to +0.5
CENTRAL WAVELENGTH (NM)	1310
FIBER MODE	SMF
TRANSMISSION DISTANCE	10 km (6.21 miles)

9. 16Gb FC/10GbE 100m SFP+ Transceiver

TRANSMITTER POWER (DBM)^3	Maximum -14 Minimum -7.8
RECEIVER POWER (DBM)^3	Maximum -1 Minimum -11
WAVELENGTH	840 to 860 nm
FIBER MODE	MMF
COMMERCIAL TEMPERATURE RANGE	0 to 70°C (32 to 158°F)
STORAGE TEMPERATURE RANGE	-40 to 85°C (-40 to 185°F)

10. 24/28 PORT GBE WEB MANAGED L2 ACCESS SWITCH WITH 4 SFP PORTS: CISCO/DELL/HP

MANAGEABILITY	Switch must have front end console cable.
RACK SIZE	Switch must have 1U form factor.
PERFORMANCE	Switch should have packet buffer size of 512 KB. Support 32K MAC addresses and 4094 VLANs. Throughput of 40 Mpps or better. Switching capacity of 55 Gbps or better.

	Shall provide Gigabit (100 Mb) Latency of < 5 μs and 1Gbps
AUTHENTICATION	Should support Authentication Flexibility Like: IEEE 802.1X Web based authentication Mac based authentication
LAYER 3 SERVICES	Should support Dynamic ARP protection, DHCP protection and Secure FTP.
LAYER 3 ROUTING	Should support Policy based routing support.
ENVIRONMENT	Operating temperature 32°F to 104°F (0°C to 40°C) Operating relative humidity 10% to 90%, noncondensing
WARRANTY	Lifetime warranty.

**11. 24/28 PORT GBE ,L2 POE+ ACCESS SWITCH HAVING 4 SFP PORTS:
CISCO/HP/DELL**

MANAGEABILITY	Switch must have front end console cable.
RACK SIZE	Switch must have 1U form factor.
PERFORMANCE	Switch should have packet buffer size of 512 Kb to 16MB. Support 32K MAC addresses and 4094 VLANs. Throughput of 40 Mpps or better. Switching capacity of 55 Gbps – 1Tbps Shall provide Gigabit (100 Mb) Latency of < 5 μs Latency of < 5 μs
AUTHENTICATION	Should support Authentication Flexibility Like: IEEE 802.1X Web based authentication Mac based authentication
LAYER 3 SERVICES	Should support Dynamic ARP protection, DHCP protection and Secure FTP.
LAYER 3 ROUTING	Should support Policy based routing support.
ENVIRONMENT	Operating temperature 32°F to 104°F (0°C to 40°C) Operating relative humidity 10% to 90%, noncondensing
WARRANTY	5 year Warranty

12. NEXT GENERATION UTM- FIREWALL: FORTINET/CHECKPOINT

INTERFACES, POWER SUPPLY AND	The appliance shall be supplied with at least 8 nos 10/100/1000 Gigabit ports.
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STORAGE	<p>Firewall should have local in-built storage of minimum 200GB SSD.</p> <p>Firewall should have minimum 8GB memory.</p>
GENERAL FEATURE	<p>9 Gbps of firewall throughput</p> <p>690 Mbps of NGFW1</p> <p>395 Mbps of Threat Prevention</p> <p>150,000 connections per second, 64 byte response.</p> <p>Solution should be an integrated Next Gen Firewall platform which includes firewall, application control, IPS, Anti-Spyware, URL Filtering and Advanced Persistent threat Prevention capabilities in a single appliance, configured in High Availability Mode.</p> <p>Firewall must have minimum 500 Mbps of real world multiprotocol throughput including firewall, IPS, application visibility, Anti-Bot, Anti-Spyware, URL Filtering and Advanced Persistent threat Prevention features running at the same time.</p> <p>Network Security Firewall should support "Stateful" policy inspection technology. It should also have application intelligence for commonly used TCP/IP protocols like telnet, ftp etc. सत्यमेव जयते</p> <p>Appliance should have granular visibility with respect to user and group policy.</p> <p>The proposed solution shall support DNS proxy.</p> <p>Proposed solution support Multi Link Management and should support minimum two ISPs.</p> <p>Should provide clear indications that highlight regulations with serious indications of potential breaches with respect to Access Policies, Intrusion, Malwares, BOT, URL, Applications etc.</p> <p>Required software license for providing above features shall be included in the solution.</p> <p>It should be able to scan SSL & TLS traffic.</p>
VPN	<p>2.16 Gbps of AES-128 VPN throughput</p> <p>Firewall should support 3DES/AES IPSEC VPN</p>

	<p>throughput of at least 300 Mbps.</p> <p>It should support the Firewall and IPSEC VPN as integrated security functions.</p>
ADMINISTRATION, AUTHENTICATION & GENERAL CONFIGURATION	<p>The Firewall should support authentication protocols like Active Directory, LDAP and have support for Firewall passwords token-based products and X.509 digital certificates</p> <p>and integrate with Windows 2012 Active Directory for user authentication.</p>
IPS	<p>1.08 Gbps IPS</p> <p>The IPS should IPS Engine should support Vulnerability and Exploit signatures, Protocol validation, Anomaly detection, Behaviour-based detection, Multi-element correlation.</p> <p>IPS should be able to detect and prevent embedded threats with in SSL traffic.</p> <p>The proposed solution must be able to support DoS protection.</p>
WEB CONTENT AND APPLICATION FILTERING	<p>Application control must identify applications, its different categories, URLs, HTTPS inspection, Malware content sites, IP and/or user-based policies.</p> <p>Solution must have a URL categorization and URLs filtering database. The solution should have the capabilities to block, permit, allow & log, protocols other than HTTP, HTTPs, FTP, SFTP.</p> <p>Should scan outbound URL requests and ensure users do not visit websites that are known to distribute malware.</p>
SECURITY FEATURE	<p>The solution should also have the scalability to scan & secure SSL encrypted traffic passing through gateway. Should perform inspection to detect & block malicious content downloaded through SSL.</p> <p>Granularly define exceptions for SSL inspection to protect user privacy and comply with corporate policy.</p> <p>Solution should have capability to integrate with APT system to detect & Prevent bot outbreaks and APT attacks.</p> <p>Solution should be able to detect & Prevent the Bot infected machine.</p>

	<p>Solution should be able to detect & Prevent Unique communication patterns used by BOTs i.e. Information about Botnet family.</p> <p>Solution should be able to detect & Prevent attack types i.e., such as spam sending click fraud or self-distribution, that are associated with Bots</p> <p>The solution should eliminate threats and remove exploitable content, including active content and embedded objects.</p> <p>The solution should provide the protection from zero-day attacks, known & un-known attacks.</p> <p>The solution should support detection & prevention of Cryptors & ransom ware and variants (Crypt locker , Crypto Wall etc) through use of static and/or dynamic analysis.</p> <p>The solution should be able to scan & find for unknown threats in executable, archive files, documents, JAVA and flash like: 7z ,cab, csv, doc, pdf, ppt, pptx, rar, rtf, scr, swf, tar, docx, , jar, xls, , xlsx, zip etc.</p>
<p>MANAGEMENT, LOGGING REPORTING</p> <p>AND</p>	<p>Upon malicious files detection, a detailed report should be generated for each one of the malicious files.</p> <p>Firewall central management reporting, logging and narmour solution must be in dedicated appliance foot print.</p> <p>Centralized Firewall management should be able to manage all functions specified in Firewall, NIPS, AntiBot specification from central console.</p> <p>Firewall should be able to provide central logging, Analysis and granular reporting.</p> <p>Management (Management, reporting, analysis) System Support for role-based administration of firewall.</p> <p>Solution should support analysis of traffic pattern using graphs and charts</p>

13. NAS STORAGE SYSTEM: NETGEAR/HP/WESTERN DIGITAL

	<p>NAS 48TB</p> <p>Redundant Power Supply</p> <p>Automatic RAID protection against disk failure</p> <p>RAID 5 technology</p> <p>1.4GHz quad core processor for accelerated read/write</p>
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	<p>Automatic multi-folder backup and RAID, which keeps the integrity of your data even in the event of hard drive failure</p> <p>Exclusive snapshot technology keeps historical versions of data, to easily revert files if necessary</p> <p>Real-time anti-virus software protects against viruses and malware</p> <p>Bit rot protection defends against media degradation</p>
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14. CENTRAL CONTROL ROOM DESIGN SET UP AND 5 YEAR WARRANTY SUPPORT

	<p>Design and documentation,</p> <p>Installation of Server , Storage, Firewall, Router , Desktops, Core switch,42U rack, Implementation, Data centre build ,</p> <p>Civil and electrical related design & documentation, Training , hand-holding</p> <p>Commissioning of the entire system with District control rooms,</p> <p>Knowledge transfer, Warranty & Support for 5 years with necessary Manpower support.</p>
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15. CENTRAL CONTROL ROOM SERVICE AND SUPPORT

	<p>Warranty & Hardware Support for with necessary Manpower support for 5 years</p> <p>L2 engineer will be provided onsite who has knowledge of Experience in Network Management / Data Center / Server Management (Mandatory) Technologies, Configuration, implementation and troubleshooting experience of all Routing & Switching Protocols, firewall, core switching , SAN etc...</p> <p>Coordination with OEM for all warranty support for hardware replacement , bug fixes , patches update, IOS upgrade, any configuration changes ,</p> <p>Policy updates, monitor for 10Am to 6PM,</p> <p>Dedicated onsite L2 engineer for 36 months</p>
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16. GENERATOR 150/160 KVA

GENERATOR RATING	KVA - 150/160KVA with AMF control Panel comprising
ENGINE	- diesel engine, water cooled, Stamford or superior make Alternator and potential free contacts and digital out facility and should have all provision for future DG automation without adding any components in the DG set and complete with control Panel, fuel tank of suitable capacity and battery with leads and anti-vibration pads and residential type silencer. The DG set shall conform to detailed specifications attached with this schedule.
OPERATING CONDITIONS	<ul style="list-style-type: none"> - The engine alternator shall be capable of working at any ambient temperature between 0 Deg C to 50 Deg C with relative humidity upto 95% condition. - The working KVA rating at site condition after accounting for de-rating shall be obtained at 0.8 power factor. - When there is an electrical main supply failure it will be required to work continuously for a period which may even exceed 24hour at a time. - The set shall be capable of taking 10% overload for a period of one hour during every 12hours.
OUTPUT VOLTAGE FREQUENCY AND WAVE FORM	- Nominal output voltage shall be 415Volt with + 1% manual adjustment at all conditions of the load. Frequency shall be 50Hz + 3% Hz in output waveform.
SILENCER	- Residential silencer with approved make/supplied by the engine manufacturer shall be provided. Silencer shall be supported on both ends and located as per engine manufacturer recommendations. Silencer shall be provided outside the canopy. The exhaust system of the generator must not be positioned to make any mark on the fence, containers or tower.
SPEED AND GOVERNING	- The engine shall operate on 1500 RPM, and be able to meet site conditions with regard to Voltage, Speed, Frequency and regulation equipped with governor of required accuracy.

BATTERY CHARGING	<ul style="list-style-type: none"> - The battery charging shall be done through alternator and solid state battery charger.
ACCESSORIES	<ul style="list-style-type: none"> - Heavy duties fly wheel. - Coupling with guard. - Fuel Pump suitable for lifting the fuel from fuel tank provided below E/Asets. - Governor. - Pre filters, Fuel Filter - Pre-filter in lift pump/button filter. - Lubricating oil filter. - Residential exhaust silencer. - Electrical Starter motor - Blower fan. - Charging Alternator. - Digital electronic Governor Stainless steel exhaust flexible coupling - Radiator - Coolant inhibitor - Air Cleaner - All accessories included in the standard set like safeties, solenoid valve etc. shall be got from manufactures as a part of equipment.
INTEGRATED CONTROL SYSTEM	<ul style="list-style-type: none"> - Microprocessor based generator set monitoring , protection and electronic governing system .The monitoring system should be designed for the genset environment, provides genset protection, engine control and displays genset parameters (both engine & alternator), eliminating use of multiple conventional controls & metering.
AC INSTRUMENTS	<ul style="list-style-type: none"> - 3-phase AC Amps - 3-phase AC volts - KW - VA - Power factor - Frequency
MEASUREMENTS/INSTRUMENTATION	<ul style="list-style-type: none"> - Lube oil pressure - Coolant temperature - Engine speed

	<ul style="list-style-type: none"> - Hours run - Battery voltage
ENGINE PROTECTION	<ul style="list-style-type: none"> - High coolant temperature (Audio-visual alarm & trip) - Low lube oil pressure (Audio-visual alarm & trip) - Fail to crank (trip) - Fail to start (trip) - Over speed (trip) - Low /High battery voltage (Audio-visual alarm) - Low coolant level shutdown(trip) - Engine shuts down due Charge alternator failure (Audio-visual alarm) - Engine shuts down due to lack of fuel (Audio-visual alarm)
ALTERNATOR	<ul style="list-style-type: none"> - The alternator shall be self-excited, self-regulated copper wound and totally enclosed for screen protected class-H insulation, designed and constructed to with stand tropical condition. Voltage regulation shall be + 1%. With digital automatic voltage regulator - The winding shall be star connected and neutral shall be brought out to the terminal box for earth with two independent earths. The terminal of the alternator output shall be enclosed in the terminal box. The AC/ DC wiring shall be separated from each other.

17. UPS 60KVA- KELTRON/HYKON/APC/GE/VERTIV

CAPACITY	60kVA
QTY	2 nos
TYPE	True Online Double Conversion, pure sine wave, Microprocessor based DSP controlled, UPS System connected in Parallel Redundant Load Sharing Configuration with Echo-mode, SNMP/ ModBus protocol supported.
PARALLELING	Each UPS unit should have inbuilt Parallel Kit. UPS should be capable of connected in Standalone Configuration, Cold start future.
GALVANIC ISOLATION	Inbuilt Isolation Transformer

OVERALL EFFICIENCY	> 95%
INPUT VOLTAGE	380V/400V/415V VAC (3 phase+N+E)
INPUT VOLTAGE RANGE	208-478VAC
RECTIFIER & INVERTER	IGBT Rectifier & IGBT Inverter
INPUT CURRENT HARMONICS (THDI)	< 2% at full load (without use of any additional filters)
INPUT POWER FACTOR	0.99 or better
INPUT FREQUENCY	40 Hz to 70 Hz
OUTPUT VOLTAGE and Frequency.	400V, 3phase 50Hz. Settable for 380V / 400 V / 415 V AC (3Ph+N+PE), 50Hz+/-0.1Hz
OUTPUT VOLTAGE REGULATION	+/- 1% for 100% unbalanced loads
RATED POWER FACTOR	0.9 or better
RECOVERY TIME	<= 20ms (within one cycle) for 100% load change
WAVE FORM	Pure sine wave
OUTPUT DISTORTION	<= 2% for linear load, < 5% for non linear load
OVERLOAD CAPACITY	115% for 10 minutes, 130% for 1 minute
BYPASS	Automatic & Manual Bypass switch facility to be provided
SWITCHGEARS	Inbuilt Input, Output & Battery Isolators
COMMUNICATION SOFTWARE & CONNECTIVITY	SNMP Network monitoring
BATTERY TYPE	Sealed Maintenance Free for 30 Minutes for each UPS
BATTERY MAKE	Amarraja/Panasonic /Exide
BATTERY REQUIRED VAH	Minimum 54000 per UPS

STANDARDS	ISO 9001:2015, ISO 14001:2015, CE,ROHS, OHSAS OR Equivalent certification
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18. CENTRAL CONTROL ROOM BUILD UP & INTERIOR

<p>Total area of furnishing required at one place is 2100 Square feet area.</p>	<p>Interior Design/ POP, false ceiling , flooring, Entire modular furniture, RTO Cabin , Officers cabins, Tables, Chairs, Other furniture, Partitions, Server room integration, Lighting, Power wiring, UPS wiring, Generator wiring ,Industrial earthing, Over all Furnishing, Reception area furnishing with furniture, Toilet Modification, Networking for entire equipment's, Passive cabling Rack to Rack connectivity with 10G solution ,MPO cassettes , comfort AC</p> <p>The proposed Control room shall have non permissible airtight, Thermally insulated and fire rated partition walls.</p> <p>Both the real ceiling and real flooring to be leak proof. Rigid floor -to- ceiling partition walls having minimum 2 – Hr. fire proof rating are to be considered.</p> <p>Partition with fire, Moisture resistant with thermal properties preferably block size of 600 X 200 X 200 with cement mortar 1:4 plastering including racking joints curing scaffoldings etc.</p> <p>False ceiling: The false ceiling shall be aerolite lightweight Calcium Silicate ceiling/Mineral fiber board modular and grid type(600 X 600 tiles type) including covering the beams with fire rated board. All the ceiling tiles with grid shall be supported on suitable powder coated galvanized steel/hot dipped galvanized steel white shade suspension as per manufacturer specification. The ceiling shall be provisioned with cut-outs for lighting, Fire detectors, nozzles etc. Horizontal level False ceiling grid using hot dipped galvanized steel.</p> <p>Flooring: The server room and power room should have epoxy access flooring with antistatic. Access floor systems shall confirm to EN 12825 standards. The entire access floor system shall be made from calcium sulphate, cement and steel, solid fire resistant material to provide adequate fire properties, acoustic barrier and air leakage resistance. The system shall be able to withstand a UDL of 1631kg/sq.m.</p>
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	<p>Point load of 305kg.The pedestal shall withstand axial load of 2200kg size. The ratio of UDL concentrated load should be minimum 5 times. For server room the under structure system shall be rigid –grid with 24” (600mm) clearance between bottom of tile and top of treated real floor. Assembly shall provide a means of leveling and locking at a selected height. Assembly shall provide 30 mm adjustment. The access floor panel shall be laminated with finishes as required and same shall be factory laminated on semiautomatic lamination lines having no chance for human error. The finish shall be either high pressure laminate/Antistatic vinyl flooring.</p>
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19.CONNECTIVITY FOR CENTRAL& DISTRICT CONTROL ROOM

<p>Lease Line</p>	<p>For Central Control Room- Minimum 100 Mbps Leased Fiber Internet Connectivity from a Major ISP with 24 hour support and an alternate with minimum 50 Mbps for redundancy. For District Control Room- Minimum 20 Mbps Leased Fiber Internet Connectivity from a Major ISP with 24 hour support and an alternate with minimum 10 Mbps for redundancy.</p>
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20.PRECISION COOLING SYSTEM AND RACK FOR CENTRAL CONTROL ROOM

	<p>Precision Cooling System as per Design 42/45 U RACK- APW/ RITTAL/VALRACK with high density cable manager, Power distribution Unit and other accessoriesAs required</p>
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21.CCTV SYSTEM AT CENTRAL CONTROL ROOM

	<p>6 numbers of IP cameras and NVR</p>
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22. FIRE AND SAFETY SYSTEM FOR CENTRAL CONTROL ROOM SERVER,UPS, BATTERY AND WORK STATION AREA

	<p>Fire Suppression System as per Design 7 Requirement Environment Friendly Clean Agent Based Automatic Fire Suppression System VESDA (Very Early Smoke Detection System) Should Provide the earliest possible warning</p>
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	To cover Server Area, Workstation area, UPS Room, and Battery Room.
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23. ATTENDANCE AND ACCESS CONTROL SYSTEM FOR CENTRAL CONTROL ROOM

	Attendance System with Central HR management and Entry based on Smart card controlled access system with EPABX SYSTEM
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DISTRICT CONTROL ROOMS

24. DISTRICT CONTROL ROOM BUILD UP & INTERIOR

Total area of furnishing required at one place is 1400 – 2100 Square feet area.	Interior Design/ POP, false ceiling , flooring, Entire modular furniture, RTO Cabin , Officers cabins, Tables, Chairs, Other furniture, Partitions, Server room integration, Lighting, Power wiring, UPS wiring, Generator wiring ,Industrial earthing, Over all Furnishing, Reception area furnishing with furniture, Toilet Modification, Networking for entire equipment's, AC.
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25. CCTV SYSTEM AT DISTRICT CONTROL ROOM

	4 numbers of IP cameras and NVR
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26. ATTENDANCE MANAGEMENT SYSTEM FOR DISTRICT CONTROL ROOM

	Attendance System with HR management system with EPABX
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27. LAPTOPS (INDUSTRIAL GRADE) DELL/HP/ACER

PROCESSOR	Core i5 10210U (1.6GHz, 4 Core, 6MB Cache)
RAM	RAM – 8GB, DDR4, 2400MHz
HARD DRIVE	Min. 1 TB hard drive
OPERATING SYSTEM	Windows 10 Prof
GRAPHICS CARD	Any with Display Port/HDMI or DVI support*
Screen	15.1" widescreen LCD
WARRANTY	5 year warranty

28. DESKTOP COMPUTERS (INDUSTRIAL GRADE) DELL/HP/ACER

PROCESSOR	Core i5 9400 (2.9GHz, 6 Core, 9MB Cache)
RAM	- RAM – 8GB, DDR4, 2400MHz
HARD DRIVE	- Min. 1 TB hard drive 7200 rpm, 256 GB SSD hard drive
OPERATING SYSTEM	- Windows 10 Prof
GRAPHICS CARD	- Dual Display
MONITOR	- 22" widescreen LCD
WARRANTY	- 5 year warranty

29. HEAVY DUTY PRINTER- HP/ CANNON

Print speed black	Normal: Up to 23 ppm
Duty cycle (monthly, A4)	Up to 50,000 pages per month
Print technology	Laser
Print quality	Optical: 600 x 600 dpi
Display	4-Line LCD
Processor speed	600 MHz
Connectivity	High speed USB 2.0, Built-in Ethernet 10/100 Base TX networking
Memory	128 MB
Paper handling input	100-sheet multi-purpose tray 1, 250-sheet input tray 2, automatic two-sided printing
Paper handling output	Up to 250 Sheets
Maximum output capacity	Up to 250 Sheets
Duplex printing	Plain, Mid-weight, Light, LaserJet, Colored, Pre-printed, Recycled, Intermediate, Letterhead, Pre-punched, A4, A5, B5(JIS), Letter, Executive, Statement, A3, B4(JIS), B5(JIS), 8K, 16K, 11x17, Legal, Oficio 216x340, Oficio 8.5 x 13 16 x 29 lb, (60 x 110 g)
Power	AC 220 – 240V: 50/60Hz, Normal Operation 550W, Ready

	80W, Max/Peak 1.1kWh, Sleep/Power Off 1W/0.2W, TEC 0.998kwh
Power consumption	TEC: 0.998 kWh
Operating temperature range	10 to 30°C

30.6 KVA ONLINE UPS HYKON/APC/GE/VERTIV/KELTRON

Power	6KVA
Input	Single phase & earth ground
Voltage range	184 – 288VAC @ 100% load
Frequency	40 – 70 Hz
Output system	Single phase & earth ground
Output voltage	208V/220V/230V/240V settable
Output waveform	Pure sine wave
Output frequency	50Hz +/- 0.02% (free running)
Voltage regulation	+/- 1%
Battery Charging current	1 to 5A adjustable
Charger type	Constant voltage constant current
Overall efficiency @ full load	94%
Inverter efficiency @ full load	93%
Manual bypass	Yes
Protection	Short circuit, input over and under voltage, overcharging of battery, output over and under voltage
Audible alarm	Battery low, mains failure, over temperature, inverter overload, fan failure
Enclosure grade of protection	IP 20
Operating temperature	0 – 40 deg

31. 48 PORT GIGABIT SWITCH -CISCO/DELL/HP

	Maximum throughput at wire speed with 100Gbps non-blocking switching architecture. Auto "denial-of-service" (DoS) prevention. Link Aggregation and Loop Prevention to add redundancy and increase your speed Rate limiting and priority queuing for better bandwidth allocation. Energy Efficient Ethernet (IEEE 802.3az) for maximum power savings.
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32. FIREWALL -FORTINET/CHECKPOINT

IPS Throughput (Mbps)	325
Firewall, 1518 byte UDP packets (Mbps)	2000
VPN, AES-128 Throughput (Mbps)	275
IPsec VPN Tunnels	980
IPS (Mbps)	50
Antivirus (Mbps)	50
Connections per Second	20000
Concurrent Connections	500,000
Firewall Throughput (Mbps)	900
Threat Prevention (Mbps)	100
Security	Firewall, VPN, User Awareness, QoS, Application Control, URL Filtering, IPS, Anti-Bot, Antivirus, Anti-Spam and SandBlast Threat Emulation (sandboxing)
Unicast, Multicast Routing	OSPFv2, BGPv4 and 4++, RIP, PIM (SM, DM, SSM), IGMP
Mobile Access User License	100 in default package, 150 maximum
WAN	1x 10/100/1000Base-T RJ-45 port

DMZ	1x 10/100/1000Base-T RJ-45 port
LAN Switch	6x 10/100/1000Base-T RJ-45 ports
Wi-Fi (optional)	802.11 b/g/n/ac MIMO 3x3
Radio Band (association rate)	1 radio band: 2.4Ghz (max 450 Mbps) or 5Ghz (max 1300 Mbps)
Console Port	1x RJ-45, 1x Mini USB
USB Port	1x USB 3.0
3G/4G Modem Support	Yes
DSL (optional)	VDSL: G.993.1 (VDSL), G.993.2 (VDSL2), G.993.5 (VDSL2 Vectoring), G.998.4 (G.INP) VDSL2 profiles: 8a, 8b, 8c, 8d, 12a, 12b, and 17a ADSL: Annex A (POTS), Annex B (ISDN), G.992.1 (ADSL), G.992.3 (ADSL2), G.992.5 (ADSL2+), Annex M (ADSL2/2+) ,Annex L Reach-extended (ADSL2) Dying Gasp, DSL Forum TR-067, TR-100, TR-114 Conformity
Enclosure	Desktop
Operating / Storage	0°C ~ 40°C / -45°C ~ 60°C (5~95%, non-condensing)
AC Input	110 ~ 240V, 50 ~ 60 Hz
Power Supply Rating	12V/3.33A 40W desktop adaptor
Power Consumption (Max)	25W (non-Wi-Fi), 30W (Wi-Fi)
Safety/Emissions/Environment	UL/c-UL, IEC 60950 CB / EMC: EN55022 Class B, FCC: Part 15 Class B / RoHS, REACH, WEEE

CENTRAL CONTROL ROOM SW APPLICATIONS & LICENCES

33. System Device Manager	Field Hardware interface module: Management of all the devices installed on roads/junctions via TCP/IP or Serial Port etc.
	Configuring the various parameters of controllers, cameras, network video storage devices, AI Controllers etc.
	Troubleshooting applications also to be provided.
	As all systems require configuration based on application type

	and nature of offences, the applications will be customized as per installation needs.
34. Offence Image Server Manager	Field Hardware interface module: Offences will be captured by devices on roads. Offence Images from all locations installed on roads to be downloaded to the configured download storage.
	Modules for performing ANPR on downloaded images to be done seamlessly while being downloaded.
	Metadata - image capture details will be stored. Image Server will save accordingly to the databases and file-system storage.
	Charge-Memo Server Application will connect with Image Server to present offence image and associated data.
35. ANPR SW licenses	Automatic Number Plate Recognition to be done by independent ANPR Detection Systems in such a way that it does not affect the overall system functioning. The ANPR System Application to run seamlessly integrated with all the systems.
	SW should classify vehicles to the following category for analysis. The classes required are motorbike, Auto, Car, Bus, Truck, SUV, Mini-Truck
	The accuracy of the ANPR system(day & night) should minimum as requested below
	a. Vehicle Classification accuracy - 90 % for above classes
	b. Vehicle number plate reading accuracy – 95 % for all standard vehicle number plates (both reflective, non reflective, yellow and white plates) with max 1 character error.
	c. The system should be able to read the number plate data reliability without fall in accuracy for varying font size, type.
	The system should use Artificial Intelligence(Neural network) based technology, and should provide free upgrades for next 5 years to maintain the accuracy as requested above
	The system should be capable to train for new number plates types/design introduced by Govt. of India

<p>36. Challan Processing Server Application</p>	<p>Downloaded images will be presented to users for challan generation.</p>
	<p>Role based user access will be provided for Operators and Administrators</p>
	<p>Operators can be given District wise Device Access for Challan Generation if required.</p>
	<p>User will be provided with Offence Image with supporting evidence images with License number Plate. Address can be fetched from License Plate - Address Retrieval Subsystem.</p>
	<p>Operator can approve or disapprove Charge memos based on the captured image. The generated charge memos will be linked and uploaded to the payment management Solution via sub-modules. Charge memos can also be sent to VAHAN subsystem as per requirement.</p>
	<p>Offence will be made Dispatch ready and can be done instantaneously. Batch dispatching can also be done later by another or same operator.</p>
	<p>Various reports regarding Charge memo generation, Offences committed can be generated based on Devices/District/Date/Month/Year/Range of dates.</p>
	<p>A dashboard as per modern requirements will be available showing status and statistics of Devices/Offences/Users etc. Historical data can also be retrieved if required.</p>
	<p>There will be violation images with evidence images or sequence of images along with violation report. Minimum one image with Vehicle License plate visible clearly. Also should have information like date, time of offence, location ID, Violation ID, speed, Violation details , Motor vehicle applicable Law/ Act, fine amount, due dates, etc.</p>
	<p>Automatic download of captured violations by server software from multiple locations should be possible. There should be Automatic Number Plate recognition by System Software while downloading</p>

	Configure the capture stations – It should be possible to perform Machine ID Settings / Sensor / Flash / Camera Parameters / Date & Time / Connection Parameters / Access Settings, etc. through system software running on the server
	User should be able to use any standard web-browser to access violations downloaded by the server software
	Options for penalizing and dispatching violations should be available. Also, it should be possible for the Megapixel image to be zoomed/ processed by user for creating Challan
	It should be possible for the Challan format to be modified according to the project/ system requirements
	User Management – It should be possible to create Multiple user ID for using the Challan Processing Software and set the privileges.
	It should be possible to get vehicle/owner information from State Motor Vehicle database and embed it into the Challan
	Challan data information should be customizable. Settings should be provided for changing Fine Amount, Header, Footer, Logo, Challan Printing Office etc., for Administrator privilege
	Various reports like Search Vehicle, User's Report, Violation Analysis Report, Dispatch Report, System Events Report etc., should be available
	All the requirements will be performed by Challan Processing Server Application. Various sub-modules and applications for database connection, Image Retrieval, Chargememo Generation, Webservers, Database Suites, Server Management Suites, etc will be used to cater the functionalities.
37. VAHAN Integration Modules	VAHAN integration is required for address fetching of owners, charge-memo generation, payment information. The VAHAN system can be integrated as per requirements. Various security measures regarding application development, software installation, servers is mandatory as per the department.

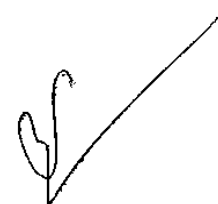
39. Payment Management Solution	<p>The payment collection and offence dispatch to be treated differently. Payment solution will keep record of all the payments received and user can also make payment through its unique online payment gateway. On successful payment, a receipt with unique id will be generated and given to the user in digital format. Same information can be passed to VAHAN also as per End User requirements.</p>
	<p>Role based access will be provided based on user types, privileges, offices etc. Functionalities will be provided for managing users, offices, reminder dispatch etc.</p>
	<p>Online payment gateway will be provided via generic online solutions like Billdesk. Other merchants can also be added as per requirement.</p>
	<p>MIS Reporting Subsystem: Payment solution will require all kind of reporting systems required for auditing purposes. The report generation tool should have daily/monthly/yearly reconciliation statements. Payment pending, Charge-Memo re-issue of unpaid users with fine, payment collection daily/monthly/yearly/within a date-range, graphical / statistical / data reports to be included.</p>
	<p>Web based software application, should include both Cash Counter and Online Payment modes</p>
	<p>Should be a highly secured multi-level Authorization and Authentication system</p>
	<p>Should have Data security through Encryption</p>
	<p>Should use Secured Socket Layer for financial data transfer through internet</p>
	<p>It should be possible for the Administrator to create username and password users with different privileges, and assign type of privileges as required</p>
	<p>It should be possible for the users to manage the system from their terminals using their username and password, according to the powers assigned to them</p>
<p>It should be possible for the Administrator to back up the data</p>	

at a particular interval
It should be possible for the Administrator to get report on cash collected on daily basis for any cash collection location or for all locations
Data received from challan processing software should include, (XML File).
1. Unique Chelan Id.
2. Vehicle registration number.
3. Name of the registered owner.
4. Address of the registered owner.
5. Location of Offense.
6. Offense Type and its nature.
7. Date and time of detection.
8. MVD Rules.
9. Fine Amount.
10. Details regarding violation.
It should be possible for the Administrator to get reports regarding treasury remittance
It should be possible for the Administrator to get the Statutory reports which are to be submitted to the government
It should be possible for the Administrator to get MIS Reports for periodic reviews and for statistical purposes.
It should be possible for the Administrator to generate reports of total charge memos received, paid / non – paid cases and send reminders for payment non – collected cases.
This software should also print receipt for each collection with details as below, Unique Chelan Id, Name of the registered user, Fine Amount, Date of Payment, Mode of Payment, Collecting Officer Id, RT Office Id, Counter No, etc.
The software should have a facility send reminders (with increased fine) if the payment is not received by the due date

<p>If the payments are not received after response time mentioned in the final reminder, the offense cases should be forwarded to the court for legal procedures by the authorized person</p>
<p>On closing the counter, at the end of the day a consolidated list should be generated. The list should contain:</p>
<p>1. Fine Amount (Daily Summary)</p>
<p>2. Date and time.</p>
<p>3. Counter number.</p>
<p>4. Officer Id.</p>
<p>5. RT Office Id</p>
<p>It should be possible for the consolidated list to be verified by a higher officer or the authorized person—from his/her terminal</p>
<p>The cash (Consolidated amount for a day) collected should be remitted in the bank / treasury and the corresponding "Chelan Id" provided by the treasury should be entered into the PSM by an authorized person thereby closing the account</p>
<p>A user (offender) should be able to access the page of online payment by simply clicking link in a web Page of the govt. department or browsing with web address of the online payment system</p>
<p>After entering the Vehicle Registration No. and then clicking on a submit button the user should get a list of all Charge memos pending for payment</p>
<p>He/she should be able to verify the details of all charge memos – Date & Location of violation, fine amount, compound fee(if any), Total, etc.</p>
<p>He / She can make payment of all or select charge memos</p>
<p>After selecting the Charge memos which he/she wishes to pay for and clicking the submit button he/she should get the details of each Charge memos which includes –</p>
<p>i. Date & Time,</p>

ii. Location of violation,
iii. Fine amount,
iv. Compound fee(if any),
v. Total,
vi. Grand total of all select charge memos etc.
On clicking the proceed to payment button another screen should display where he/she would be able to make payment using any one of the following mode of online payments
i. Credit card
ii. Debit card
iii. Net banking
The online payment should be done through a third party Payment Gateway (PG). The PG would necessary underground work to fulfil the online payment
PG would return notifications –whether a transaction had been a success or failure. The DB of PMS should store this notification
Online payment should be done as per the stipulated guidelines of RBI
Money should reach the bank account of govt. department within T+ 3 days
In the case of failed transactions money should be returned to the offender (customer) account within 4 days
The system should use highly secured data transfer through internet- with SSL technology
Payment could involve the participation of almost all nationalized and scheduled banks (more than 60 nos)
It should be possible for the Administrator to generate reports of cash collection of Online payment between 2 given dates
It should be possible for the Administrator to generate reports of refunded cases (failed) and settled cases (succeeded)

	<p>At the end of each day the concerned officer in the bank generates a statement of transactions of the account in which Online payment and Cash Counter payment are remitted</p> <p>He/she sends this statement as email attachment to a specified email id of the department</p> <p>PMS should periodically check this mail id and on finding the mail it should open it, read contents and store it in its Database</p> <p>PMS should make a comparison of records already available in the Database regarding each remittance and should notify discrepancy, if any</p>
<p>40. AI software License for Violation Detection</p>	<p>The Edge AI application running on either a discrete embedded computing device or on the camera-integrated computing hardware is a data stream analysis pipeline that consists of image data stream synchronization, analysis and communication components. algorithms-support consists of state-of-the-art object detection models, e.g., various versions of YOLO (and Tiny YOLO), Faster-RCNN, Efficient Det, Retina Net. Capability of AI engine includes vehicle detection, classification & violations like helmet, seatbelt, triple riding. Mobile usage etc., in day & night conditions for front side capture. with free updates for 3 years. required customizations included.</p>
<p>41. HR Management Software</p>	<p>H R Management Software for the management of operators in district control rooms and central control room.</p> <p>User based access role like administrator, operator for user management</p> <p>Standard attendance marking devices like card swipe/ fingerprint supported. Daily attendance monitoring, working hours, muster roll etc., Reporting tools available</p> <p>Max Users -64 persons/system application</p>



6. BILL OF QUANTITY- BOQ**6.1 SVDS MODULE BOQ**

Sl. No.	MODULE COMPONENTS	Qty
SPEED VIOLATION DETECTION SYSTEM MODULES		
1	INDUSTRIAL SWITCH	4
2	VIOLATION NVR MODULE	4
3	All Vehicle ANPR – NVR Modile	4
4	AC Power supply and UPS MODULE	4
5	AC Power Control & Power Conditioning MODULE	4
6	Processor Sub Module	4
7	3D Radar with Radar Interface Module	4
Lane ANPR camera		
8	Camera processor Module.	8
9	Lane ANPR Camera sensor with Lens assembly	8
EVIDENCE CAMERA:		
10	Camera processor Module	4
11	Evidence Camera sensor with Lens assembly	4
12	Pulsed Power IR Flash UNIT : 250W peak power	8
13	4G Industrial modem – Router with LAN Module	4



6.2 MSVDS MODULE BOQ

Sl. No.	MODULE COMPONENTS	Qty
1	ANPR CAMERA	
1	ANPR camera processor Module .	4
2	Lane ANPR Camera sensor with Lens assembly	4
3	MSVDS SYSTEM CONTROLLER with Industrial Switch for	4
4	Pulsed Power IR Flash UNIT: 600 W peak power	4
5	SBC & LCD Panel USER interface Module	4
6	4G Industrial modem – Router with LAN module	4
7	3D Radar with Radar Interface Sub Module	4
8	MSVDS Pan & TILT assembly	4

6.3 RLVDS MODULE - BOQ

Sl. No.	MODULE COMPONENTS	Qty
1	Industrial Switch	18
2	Sub Module: Violation NVR MODULE	18
3	AC Power supply and UPS MODULE	18
4	AC Power Control & Power Conditioning MODULE	18
5	Processor Sub Module	18
6	VPU – virtual line crossing detection MODULE	18
Lane ANPR camera		
7	Camera processor Module	36
8	Lane ANPR Camera sensor with Lens assembly MODULE	36
EVIDENCE CAMERA		

9	Camera processor Module	18
10	Evidence Camera sensor with Lens assembly MODULE	18
11	Pulsed Power IR Flash UNIT : 250W peak power	36

6.4 AI SMART CAMERA MODULE - BOQ

SI. No.	MODULE COMPONENTS - AI SMART CAMERA (3 MEGA PIXEL)	Qty
1	Lane ANPR camera processor Module	175
2	Lane ANPR Camera sensor with Lens assembly	175
3	VPU SUB SYSTEM MODULE	175
4	Pulsed Power IR Flash UNIT : 600 W peak power	175
5	4G Industrial modem – Router with LAN MODULE	175

6.5 AI SMART CAMERA MODULE -BOQ

SI. No.	MODULE COMPONENTS - AI SMART CAMERA (5 MEGA PIXEL)	Qty
1	Lane ANPR camera processor Module.	500
2	Lane ANPR Camera sensor with Lens assembly	500
3	VPU SUB SYSTEM MODULE	500
4	Pulsed Power IR Flash UNIT : 600W peak power	500
5	4G industrial modem – Router with LAN MODULE	500

6.6 AI SMART CAMERA MODULE (PARKING VIOLATION) -BOQ

SI. No.	MODULE COMPONENTS - AI SMART CAMERA: PARKING VIOLATION	Qty
6.1	PTZ-IR camera	25
6.2	VPU SUB SYSTEM MODULE	25
6.3	4G Industrial modem – Router with LAN MODULE	25

6.7. CENTRAL CONTROL ROOM - BOQ

SI. No.	CONTROLROOM	Qty
1	RACK SERVER	22 Nos.
2	STORAGE – 48 TB	5 Nos.
3	TAPE DRIVE & BACKUP SOFTWARE	1 Nos.
4	Desktop computers	8Nos
5	ANPR Desktop computers	10 Nos
6	SAN Switch	2 Nos.
7	CORE SWITCH	2 Nos.
8	10G SFP+ SINGLE MODE TRANSCEIVERS	As
9	16Gb FC/10GbE 100m SFP+ Transceiver	As required
10	24/28 PORT GBE WEB MANAGED L2 ACCESS SWITCH WITH 4 SFP PORTS	2 Nos.
11	24/28 PORT GBE ,L2 POE+ ACCESS SWITCH HAVING 4 SFP PORTS	2 Nos.
12	NEXT GENERATION UTM- FIREWALL	2 Nos.
13	NAS Storage System 48 TB	1 No.
14	Central Control Room Design Set up and Warranty	1 No.

15	CONTROL ROOM SERVICE and SUPPORT	1 No
16	GENERATOR...150/160 KVA	1 Nos.
17	U P S.....60 KVA	2 Nos.
18	Central CONTROL ROOM BUILD UP & INTERIOR	1 No.
19	Connectivity for Central Control Room	1 + 1
20	PRECISION COOLING SYSTEM AND RACK FOR CENTRAL CONTROL ROOM	1 System
21	CCTV system at Central Control room	1 System
22	FIRE and SAFETY SYSTEM AT CENTRAL CONTROL ROOM	1 System
23	Attendance and Access Control system at Central Control room	15 set

6.8. DISTRICT CONTROL ROOM - BOQ

Sl. No.	CONTROL ROOM REQUIREMENTS	Qty
1	DISTRICT CONTROL ROOM BUILD UP & INTERIOR	12 Nos
2	CCTV System at District Control room	12 Nos
3	Attendance Management system at District Control Room	12 Nos
4	Laptops	360 Nos
5	DESKTOP computers	130 Nos.
6	Heavy Duty Printer	16Nos.
7	6 KVA Online UPS	16 Nos.
8	48 PORT GIGABIT SWITCH	15 Nos.
9	Firewall	15 Nos

6.9 CENTRAL CONTROL ROOM SOFTWARE APPLICATIONS & LICENCES- BOQ

Sl. No.	CONTROLROOM SOFTWARES	Qty
1	System Device Manager	1
2	Offence Image Server Manager	8
3	ANPR SW LICENSES	748
4	Challan Processing Server Application	1
5	VAHAN Integration Modules	1
6	Payment Management Solution	1
7	AI SW license for violation detection	700
8	HR management software (Main & district control rooms)	15

6.10 AMC FOR 4TH & 5TH YEAR

Sl. No.	AMC	Qty
1.	4 th year AMC	1
2	5 th year AMC	1

6.11 FIELD INSTALLATION ITEM BOQ FOR SVDS

Sl. No.	SUPPLY	Qty
1	Cantilever Structure for SVDS as per drawing	4
2	Electricity meter box with Wiring as per drawing	4
3	Crossing Pole	4
4	Supply of Earth kits CAPE / OBO	8
5	Supply of Isolation Transformer	4
6	Installation, Commissioning and Warranty Support	4



6.12 FIELD INSTALLATION ITEMS FOR RLVDS- BOQ

Sl. No.	SUPPLY	Qty
1	Cantilever Structure for RLVDS as per drawing	18
2	Electricity meter box with Wiring as per drawing	18
3	Crossing Pole	18
4	Supply of Earth kits CAPE / OBO	36
5	Supply of Isolation Transformer	18
6	Installation, Commissioning and Warranty Support	18

6.13 INSTALLATION ITEMS FOR MSVDS- BOQ

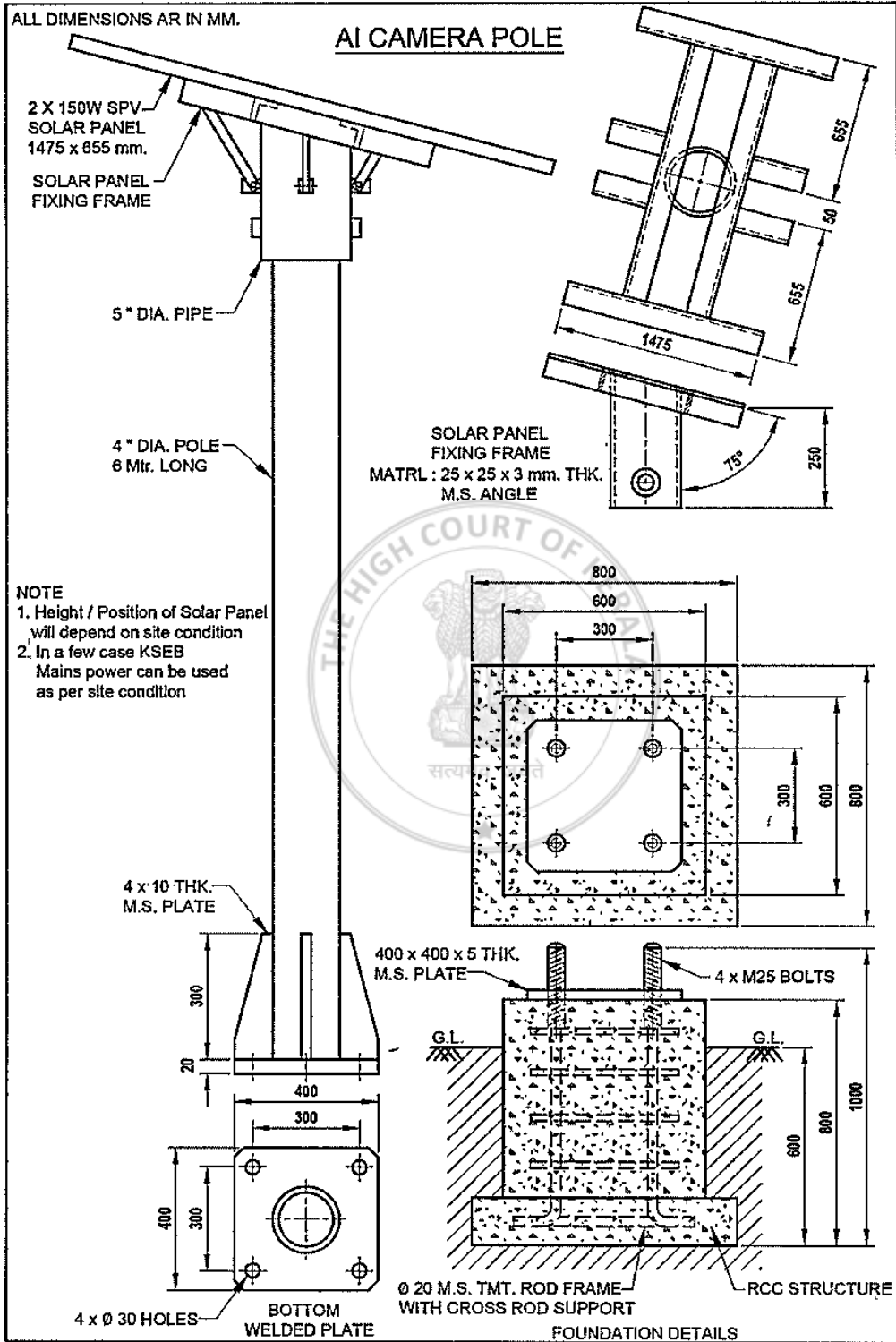
Sl. No.	SUPPLY	Qty
1	Supply of Vehicle as per requirement with custom modifications as per design TUV 300 AC model, with power steering, without rear defogger & rear wiper OR NEXON – EV with suitable electrical charging facility.	4
2	Installation, Commissioning and Warranty Support	4

6.14 FIELD INSTALLATION MATERIALS AI CAMERA - BOQ

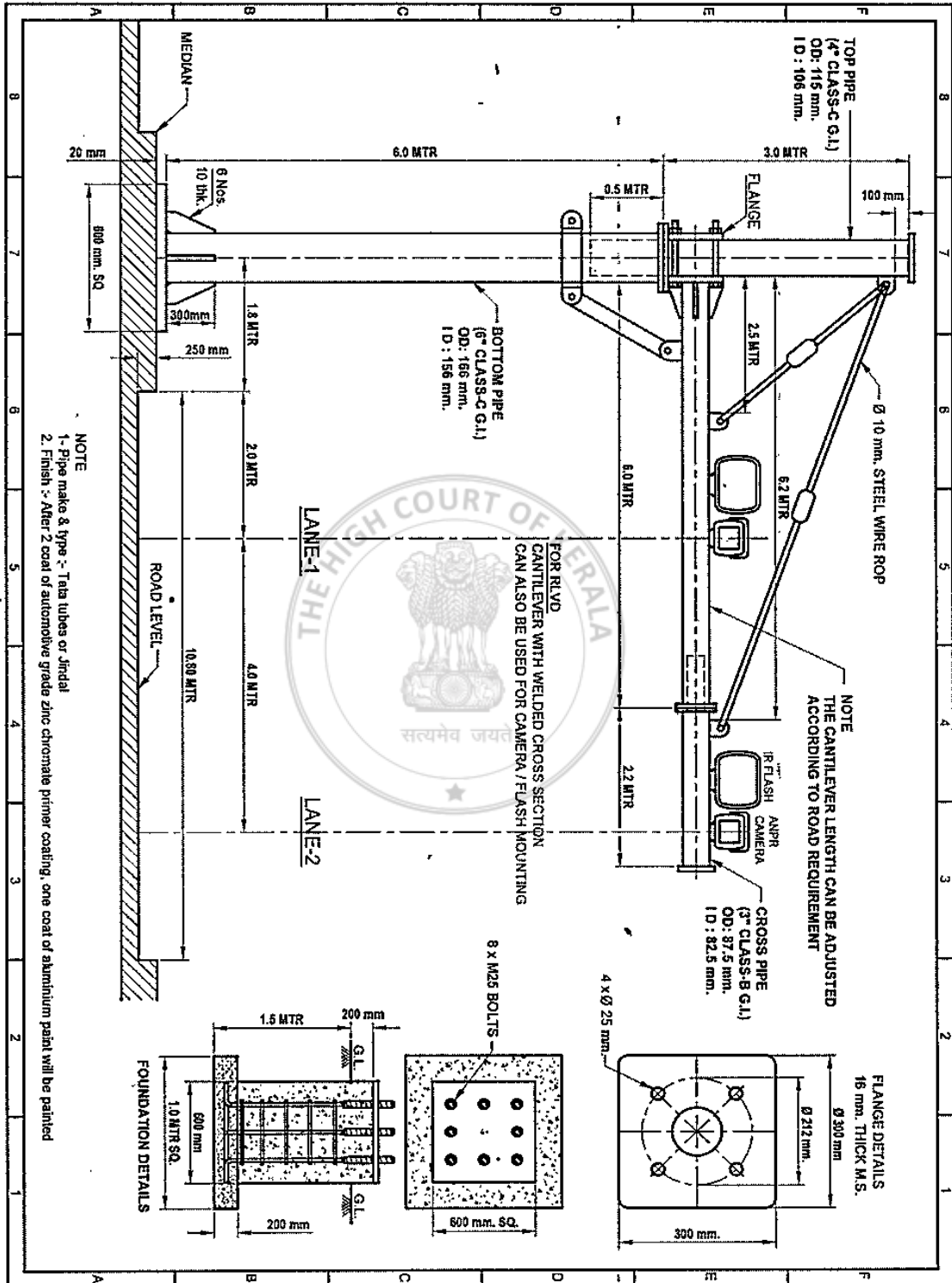
Sl. No.	SUPPLY	Qty
1	Camera Mounting pole with Solar Panel mounting frame for AI cameras as per drawing	700
2	Supply of Earth kits CAPE / OBO	700
3	Electricity meter box with Wiring as per drawing, Earthing, isolation transformer etc.	25
4	Installation, Commissioning and Warranty Support	700



AI CAMERA POLE DETAILS



CANTILEVER POLE DETAILS



Manufacturers Authorization Form

To,

Head Purchase,
Kerala State Electronics Development Corporation Ltd.
Keltron Communication Complex,
Monvila, Kulathoor P.O.,
Thiruvananthapuram-695 583, Kerala
Tel: 0471-2598948 Fax: 0471-2598984
Email: kelkcc.pur@gmail.com

Subject: Manufacturer's Authorization FormRef: Tender No. **KSEDC/KCC/CPG/ENQ/0041/20-21 Dated 26-06-2020**

Dear Sir,

We:..... (Name of the OEM) who are established and reputable manufacturers of (List of Goods) having factories or product development centers at the locations do hereby authorize M/s. (Name and address of the Bidder) to bid for the Tender No. dated for the above goods manufactured or developed by us.

We hereby extend, our warranty for the hardware goods supplied by the bidder and maintenance or support services for software products against this invitation for bid. We also confirm that our offered product will not be end of life for minimum of 5 Years from the date of bidding and the support for such offered product/s will be available for minimum of 5 years from the date of bidding.

Thanking you,

Yours faithfully,

(Authorized Signatory)

For and on behalf of: _____ (Name of the OEM)

Name:

Designation:

Place:

Date:

SERVICE AND SUPPORT CENTER DECLARATION FORM

To

Head Purchase,
Kerala State Electronics Development Corporation Ltd.
Keltron Communication Complex,
Monvila, Kulathoor P.O.,
Thiruvananthapuram-695 583, Kerala
Tel: 0471-2598948 Fax: 0471-2598984
Email: kelkcc.pur@gmail.com

Sir,

Ref : Tender No. KSEDC/KCC/CPG/ENQ/0041/20-21 Dated 26-06-2020

This has reference to the above Tender for
.....
.....
.....

We hereby declare that we have service centres / service personnel in the state for the timely service of equipment's being quoted under this tender. We will establish necessary service centres wherever needed before the start of work.

Signature of the Authorized signatory of the Applicant/Firm



SINGLE SOURCE DECLARATION FORM

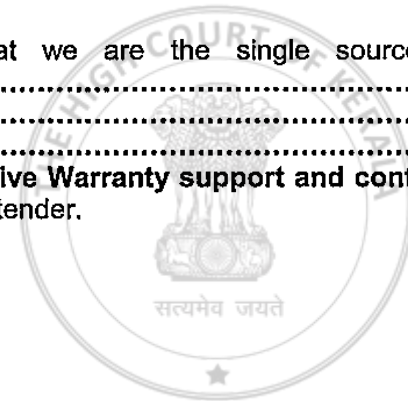
To

Head Purchase,
Kerala State Electronics Development Corporation Ltd.
Keltron Communication Complex,
Monvila, Kulathoor P.O.,
Thiruvananthapuram-695 583, Kerala
Tel: 0471-2598948 Fax: 0471-2598984
Email: kelkcc.pur@gmail.com

Sir,

Tender No. KSEDC/KCC/CPG/ENQ/0041/20-21 Dated 26-06-2020

We hereby declare that we are the single source solution provider for The
.....
.....
..... with 3
year onsite comprehensive Warranty support and continued AMC support for 2 years
as per the above referred tender.



Signature of the authorized signatory of the Applicant/Firm

VALIDITY OF THE QUOTE - DECLARATION FORM

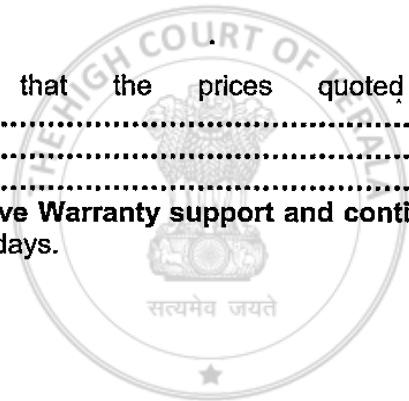
To

Head Purchase,
Kerala State Electronics Development Corporation Ltd.
Keltron Communication Complex,
Monvila, Kulathoor P.O.,
Thiruvananthapuram-695 583, Kerala
Tel: 0471-2598948 Fax: 0471-2598984
Email: kelkcc.pur@gmail.com

Sir,

Tender No. KSEDC/KCC/CPG/ENQ/0041/20-21 Dated 26-06-2020

We hereby declare that the prices quoted by us for The
.....
.....
..... with **3**
year onsite comprehensive Warranty support and continued AMC support for 2 years
is valid for a period of 180 days.



Signature of the authorized signatory of the Applicant/Firm

Validity unknown

Digitally signed by RYAS THANGAL P S
Date: 2020.06.26 16:20:34 IST
Location: Kerala-K



**KERALA STATE ELECTRONICS
DEVELOPMENT CORPORATION LTD.**
(A Government of Kerala Undertaking)



Keltron Communication Complex Telephone : 0471-2598948 (5 lines)
Monvila, Kulathoor P. O.
Thiruvananthapuram-695 583 Fax : 0471-2598984
KERALA, INDIA
CIN: U74999KL1972SGC002450 E-mail : cgmccc@keltron.org

KCM/PUR/LOI/001/20-21

11-09-2020

To,

M/s. SRIT India Private Limited,
SRIT House, # 113/18, ITPL Main Road,
Kundalahalli, Bangalore- 560 037
Ph: 080 4195 1999 / 9880333990

Letter of Intent (LOI)

Dear Sir,

Sub: - Letter of Intent (LOI) regarding "The Supply of different electronics modules, AIC modules, ANPRC modules, Vehicles for Mobile enforcement system, Supply Installation and commissioning of CCR, DCRs, field installation including street furniture, Software and Software Licenses on 5 year BOOT model with 5 year Warranty"

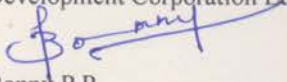
- Ref: - 1) Our e-Tender Ref.: KSEDC/KCC/CPG/ENQ/0041/20-21 dated 26-06-2020
2) Your Technical & Commercial bid dtd. 27-07-2020
3) Negotiation Meeting held at Keltron MD's office dated 27-08-2020

With reference to above referred e-Tender for "The Supply of different electronics modules, AIC modules, ANPRC modules, Vehicles for Mobile enforcement system, Supply Installation and commissioning of CCR, DCRs, field installation including street furniture, Software and Software Licenses on 5 year BOOT model with 5 year Warranty", you have been selected as L1 bidder after detailed technical evaluation and a negotiation meeting held at our MD's office on 27-08-2020. Based on this, an amount of Rs.151,10,89,515/- (Incl. of Taxes) is accepted. In addition to this, an amount of Rs.11,81,428/- (Incl. of Taxes) for the addl. requirement of revised quantities also has to be added. Hence the total value will be Rs.151,22,70,943/- (INR One Hundred Fifty One Crore Twenty Two Lakh Seventy Thousand Nine Hundred & Forty Three Only) Including Tax. You are requested to deposit a sum of Rs. 6 (Six) Crores as Security Deposit in the form of Demand Draft, as per the condition mentioned in Tender Document. Further to this, we will execute agreement in Rs. 200/- worth stamp paper within 15 days from the date of acceptance of this LOI. After that, confirmed Work Order will be released from Keltron.

Thanking You,

Yours Faithfully,

For Kerala State Electronics
Development Corporation Ltd.,


Bonny P P
Head (Purchase)
Keltron Communication Projects Group
Monvila, Kulathur P.O, Thiruvananthapuram - 695583





**KERALA STATE ELECTRONICS
DEVELOPMENT CORPORATION LTD.**
(A Government of Kerala Undertaking)



Communication Projects Group
Keltron Communication Complex
Monvila, Kulathoor P. O.
Thiruvananthapuram-695 583
KERALA, INDIA

Telephone : 0471-2598948 (5 lines)
Fax : 0471-2598984
E-mail : keltronseu@gmail.com

KCC/CPG/G36/2022-23/687

30-06-2022

To,

The Transport Commissioner,
Trans Towers, Vazhuthacad
Thiruvananthapuram, Kerala

Respected Sir,

Sub: Submission of Project details_ "Advanced Automated Traffic Enforcement System based on Boot model, for 5 years Under Safe Kerala project".

- Ref: 1) G.O. (Rt) No. 134/2020/Trans Dated 27.04.2020
2) Work Order No: E1/37/2019/TC Dated 14.05.2020
3) Agreement Executed Between MVD and M/s. Keltron on 28.05.2020

With reference to the above project for the implementation of Advanced Automated Traffic Enforcement System across Kerala, we have completed all the enforcement system manufacturing and installation across Kerala, Supply installation of entire equipment in Central control room, district control rooms and software implementation works. Now we are submitting the details of Procurement action taken by Keltron for the implementation of safe Kerala project for your Information.

We have done all procurement action as per the Kerala Govt. Store Purchase manual. The details of the procurement are given below.

Details of procurement action through E tender site of Kerala

- 1) **Keltron E-Tender reference No: KSEDC/KCC/CPG/ENQ/0041/20-21 Dated 26-06-2020**

Purpose: E tender for Procurement of Enforcement System Modules, IT components for control room, control room interior & Civil Work, Road side installation work of enforcement systems



E-Tender Opening Date: 03-08-2020

The following four companies were participated in the E tender

- 1) Ashoka Buildcorn. Ltd - Nasik
- 2) SRIT India Pvt Ltd - Bangalore
- 3) Akshara Enterprises India Pvt Ltd - Hyderabad
- 4) Gujarat Infotech Ltd – Ahmedabad

After the detailed technical evaluation the committee rejected the bid of M/s. Gujarat Infotech Ltd – Ahmedabad and recommended the remaining three companies for opening the financial bid. Based on that financial bid has been opened and the bid value given below

- a) Akshara Enterprises India Pvt Ltd – Hyderabad----Rs. 1,47,16,93,141 + GST 18%
- b) Ashoka Buildcorn. Ltd – Nasik-----Rs. 1,36,53,68,048 + GST 18%
- c) SRIT India Pvt Ltd – Bangalore-----Rs. 1,29,66,45,692 + GST 18%

Hence work awarded to technically qualified L1 Bidder, i.e. M/s. SRIT India Pvt Ltd on 11-Sep-2020. Service level Agreement also executed with this vendor on 1st Oct 2020.

2) Keltron E-Tender No: KSEDC/KCC/PUR/ENQ/0070/20-21 dated.18-07-2020

Purpose: E-Tender for SSD storage _Hard disk Supply

E-Tender Opening Date: 04-08-2020

The following companies were participated in the E tender

- a) Rashi Peripherals Pvt. Ltd, Thiruvananthapuram
- b) Electrical Mechanical Engineering

Work order Issued to L1 Bidder: M/s. Rashi Peripherals Pvt. Ltd.,
Thiruvananthapuram

Work Order Number: KCC/PO/CPG/M/0123/20-21

3) Keltron E-Tender No: KSEDC/KCC/PUR/ENQ/0088/20-21 dated 27-10-2020

Purpose: E-Tender for Supply of 40 AH, 42AH & 80AH LiFePO4 Battery & Charging Unit

E-Tender Opening Date: 24-12-2020

The following companies were participated in the E tender

M/s. Hykon India Pvt. Ltd

Since the number of participant is one, we have retendered the same on 20.11.2020,
again retendered on 16.12.2020



Work order Issued to L1 Bidder M/s. Hykon India Pvt. Ltd., Thiruvananthapuram
Work Order Number: KCC/PO/CPG/M/0440/20-21

4) Keltron E-Tender No: KSEDC/KCC/PUR/ENQ/0057/20-21 dated 21-07-2020

Purpose:- E-Tender for the Supply of Cables for the enforcement system production

E-Tender Opening Date: 11-09-2020

The following companies were participated in the E tender

- a) Electronic Cable Centre, Thiruvananthapuram
- b) Range Enterprises, Thiruvananthapuram
- c) Tranwaves Equipment Pvt Ltd, Ernakulam

Work order Issued to

M/s Electronic Cable Centre, Thiruvananthapuram

Work Order Number: KCC/PO/CPG/M/0218/20-21

Bidder M/s: Range Enterprises, Thiruvananthapuram

Work Order Number: KCC/PO/CPG/M/0219/20-21

5). Keltron E-Tender No: KSEDC/KCC/PUR/ENQ/0063/20-21 dated 13-07-2020

Purpose: E-Tender for the Supply of Military Connectors

E-Tender Opening Date: 15-08-2020

The following companies were participated in the E tender

- a). Bhavya Impex Pvt. Ltd., Mumbai
- b). Amar Radio Corporation, Bangalore

Work order Issued to L1 bidder Bhavya Impex Pvt. Ltd., Mumbai

Work Order Number: KCC/PO/CPG/M/0254/20-21 &

Amar Radio Corporation, Bangalore

Work Order Number: KCC/PO/CPG/M/0255/20-21

6). Keltron E-Tender No: KSEDC/KCC/PUR/ENQ/0122/20-21 dtd. 12-01-2021

Purpose: E-Tender for the Supply of VPP – 150W Solar Panel

E-Tender Opening Date: 11-02-2021

The following companies were participated in the E tender

- a). Hykon India Pvt. Ltd.,
- b). Solgen Energy Pvt Ltd
- C). Sinelab technologies pvt Ltd



Work order Issued to L1 bidder M/s. Hykon India Pvt. Ltd., Thiruvananthapuram
Work Order Number: KCC/PO/CPG/M/541/20-21

7). Keltron E-Tender No: KSEDC/KCC/PUR/ ADV/045/21-22 dated 04/02/2022

Purpose: E-Tender for the Supply of LiFePo4, 12V 80 AH Battery

E-Tender Opening Date: 14-02-2022

The following companies were participated in the E tender

- a). Hykon India Pvt. Ltd., Thiruvananthapuram
- b). Ultra-India Batteries Pvt. Ltd.

Work order Issued to L1 bidder M/s. Hykon India Pvt. Ltd., Thiruvananthapuram
Work Order Number: KCC/PO/CPG/T/0272/21-22 & KCC/PO/CPG/T/0319/21-22

Apart from these tendering activities Keltron has taken various procurement actions as per the store purchase manual for the manufacturing of Enforcement systems. We have completed the procurement process of this project and completed the manufacturing of enforcement production at Keltron as well as the installation & configurations of all equipment at the locations jointly Identified with MVD. The summary of procurement details given below

Summary of procurement details for Safe Kerala Project

Sr No:	Details	Invoice Amount (Base Value (Without Tax) (Rs)	Remarks
1	Total Order value of Safe Kerala project (Capex)	1,41,93,49,684.00	
2	Invoice value of Main Supplier M/s. SRIT India Pvt Ltd	1,28,15,85,545.90	Details of all Invoices, Tender documents, Purchase order details provided in book Volume number 1,2 ,3 & 4
3	Invoice value of other enforcement system manufacturing components and charges for enforcement system manufactured by Keltron	5,69,08,243.94	
4	Total value of Vendor invoices	1,33,84,93,789.84	
5	Keltron PMC Cost (5% of total procurement value)	6,69,24,689.49	
6	Total safe Kerala Project Value after implementation (Capex)	1,40,54,18,470/-	Keltron Invoice Submitted



We have completed all deliverables as part of this project and details given below

Sl. No.	DESCRIPTION	Qty.	Proposal Page no.	Document
1	Radar Based Speed enforcement system, 2L 1R	4	30	Annexure 1
2	Mobile Radar based SVDS with vehicle	4	33	Annexure 2
3	Red Light Violation Detection System (RLVDS) 3 ARM	6	24	Annexure 3
4	3 Megapixel AI Based ANPR Camera System	175	15	Annexure 4
5	5 Megapixel AI Based ANPR Camera System	500	15	Annexure 5
6	PTZ- AI Based ANPR Camera System	25	36	Annexure 6
7	State Central Control Room- Civil, Electrical, Furnishing, Supporting Infrastructure, IT Infrastructure supply, Installation, Configuration and Commissioning & support	1	50	i. Detailed Specification Non IT - Annexure 7A ii. Detailed Specification IT - Annexure 7B iii. Technical Drawings - Annexure 7C (1-15)
8	District Enforcement Control Room- Civil, Electrical, Furnishing, Supporting Infrastructure, IT Infrastructure supply, installation, Configuration and Commissioning & support	12	77	i. Detailed Specification - Annexure 8A to Annexure 19A ii. Technical Drawings Annexure 8B (1-7) to Annexure 19B (1-7)
9	Laptop (i5, 1TB Hard Disk) for MVI, AMVI, RTO	354	95	Annexure 8C to 22C
10	Desktop (RTO, MVI, Supervisor, System Admin, Operators)	124	95	Annexure 8C to 22C
11	Heavy Duty Printer (Challan Printing)	14	78	Annexure 8C to 22C
12	6 KVA Online UPS with 3 Hrs. Backup (District Control Room)	14	79	Annexure 8C to 22C
13	48 Port Gigabit Switch (District Control Room)	14		Annexure 8C to 21C
14	Firewall (District Control Room)	14	77	Annexure 8C to 21C



15	Control Room Management Software and Integration for General Enforcement processing (Tax, Insurance, PUC etc.), SOFTWARE Violation Memo processing, ,payment management etc. as per proposal, and third party software, licenses, AI licenses, ANPR licenses and Data fetching S/W for enforcing other offences form Vahan & Sarathy	1	39	
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Please note that we have completed the manufacturing, installation, Testing & commissioning of all equipment as part of Safe Kerala project and invoices of the same submitting for your verification and acceptance. We kindly request you to grant Go-live of this project so that we can start Facility management services

Thanking you,
Yours faithfully,
**FOR KERALA STATE ELECTRONICS
DEVELOPMENT CORPORATION LTD.**


Subramaniam C G
Head - Keltron Communication Complex
Monvila, Kulathoor PO
Trivandrum -695583



WORK SHEET ON 5YEAR BOOT MODEL

Sl. No.	QTY	ITEM	BASIC UNIT PRICE	PRICE WITH BOOT(6.25% AR) MULTIPLIER @ 1.875	KELTRON 5% MARGIN	GST 18% +1% Cess	UNIT PRICE WITH 18% GST & CESS 1%	TOTAL 6.25 YEAR (5 + 1.25) BOOT PRICE WITH 18% GST & CESS 1%
1	4	Radar SVDS	2534224	4751670	4989254	947958	5937212	23748849
2	4	RadarMSVDS	2880000	5400000	5670000	1077300	6747300	26989200
3	6	RLVDS	3930080	7368900	7737345	1470096	9207441	55244643
4	175	AI Enforcement System 3 MP	465696	873180	916839	174199	1091038	190931722
5	500	AI Enforcement System 5 MP	480480	900900	945945	179730	1125675	562837275
6	25	AI Enforcement System PTZ	495264	928620	975051	185260	1160311	29007767
7	1	State Central Control room	91306667	171200000	179760000	34154400	213914400	213914400
8	12	District Enforcement Control room	5866667	11000000	11550000	2194500	13744500	164934000
9	354	Laptop	80000	150000	157500	29925	187425	66348450
10	124	Desktop	64000	120000	126000	23940	149940	18592560
11	14	Heavy Duty Printer	320000	600000	630000	119700	749700	10495800

12	14	UPS System	373333	700000	735000	139650	874650	12245100
13	14	48P Gigabit Switch	64000	120000	126000	23940	149940	2099160
14	14	Firewall	213333	400000	420000	79800	499800	6997200
15	1	CCR Backend S/W	85333333	160000000	168000000	31920000	199920000	199920000
16	2	AMC For 4th & 5th Year			44000000	8360000	52360000	104720000
		TOTAL						1689026126

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Verified with work sheets provided.

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WORK ESTIMATE SHEET

Sl. No.	Item Description	QTY	Units	Responsibility	Estimated basic price (Unit)	Estimated Total price
1	RADAR BASED 3/4 D SPEED VIOLATION DETECTION SYSTEM					
a	SPEED VIOLATION DETECTION SYSTEM MODULES- Industrial Switch	1	Nos	VENDOR	29800	29800
b	Violation NVR Module	1	Nos	VENDOR	68500	68500
c	All Vehicle ANPR – NVR Module	1	Nos	VENDOR	44700	44700
d	AC Power supply and UPS MODULE	1	Nos	VENDOR	44700	44700
e	AC Power Control & Power Conditioning MODULE	1	Nos	VENDOR	37800	37800
f	Processor Sub Module	1	Nos	VENDOR	97500	97500
g	3D Radar with Radar Interface Module	1	Nos	VENDOR	686000	686000
h	Lane ANPR camera processor Module	2	Nos	VENDOR	55000	110000
i	Lane ANPR Camera sensor with Lens assembly	2	Nos	VENDOR	80000	160000
j	EVIDENCE CAMERA processor Module	1	Nos	VENDOR	45500	45500
k	Evidence Camera sensor with Lens assembly	1	Nos	VENDOR	68000	68000
l	Pulsed Power IR Flash UNIT : 250W peak power	2	Nos	VENDOR	67000	134000
m	4G Industrial modem – Router with LAN Module	1	Nos	VENDOR	18000	18000
	Keltron Purchased components for Manufacturing					
n	256GB SSD for Storage	1	Nos	KELTRON	4350	4350
o	Customised Cabinet with Fan for temperature control	1	Nos	KELTRON	15000	15000
p	42 AH Led Acid Battery	1	Nos	KELTRON	2620	2620
q	All Vehicle ANPR storage - 4 TB	1	Nos	KELTRON	4865	4865
r	Anti-tamper System	1	Nos	KELTRON	850	850
s	Mil standered connectors and cables for FHU	3	Set	KELTRON	1500	4500
t	Camera Housing (Imported)	3	Nos	KELTRON	3250	9750
u	Camera Canopy	3	Nos	KELTRON	600	1800
v	Camera Mounting Accessories	3	Set	KELTRON	1360	4080
w	Precision Cooling Fan for Camera	3	Nos	KELTRON	671	2013




x	Mill standered connectors and cables for Camera	3	Set	KELTRON	2000	6000
y	Keltron Manufacturing Charges includes					
z	a) Technical Manpower for QA Inward Inspection, In process Inspection, Final Product Inspection, Assembly, Testing, Burn in Testing and consumable Expenses	1	Set	KELTRON	25000	25000
	FIELD INSTALLATION Includes					
aa	Cantilever fabrication cost	1	Nos	VENDOR	285000	285000
ab	Basement with RCC and Cantilever Mounting Structure	1	Nos	VENDOR	80000	55000
ac	Power Connection Charges	1	Nos	VENDOR	31450	31450
ad	Industrial Earthing	2	Nos	VENDOR	9500	19000
ad	Transportation from Keltron Unit (Enforcement System) to District Storage area	1	Nos	VENDOR	2645	2645
ae	Transportation from District Storage area to Site	1	Nos	VENDOR	1000	1000
af	Cantilever Transportation from Fabrication site to installation site	1	Nos	VENDOR	12000	12000
ag	Loading and Unloading expense for Enforcement system & Cantilever Structure	1	Nos	VENDOR	4800	4800
ah	Installation & Commissioning,Radar alignment and yearly' speed calibration with calibrated laser gun	1	Nos	VENDOR	78000	78000
ai	Onsite Comprehensive Warranty Support for three years(5% per year)	3	Nos	VENDOR	140000	420000
	TOTAL				2534224	2534224
	SVDS GLOBAL SHUTTER ANPR CAMERA PRICE					142881
	SVDS GLOBAL SHUTTER EVIDANCE WIDE ANGLE CAMERA PRICE					121381

2	MSVDS - MOBILE SPEED VIOLATION DETECTION SYSTEM					
a	MSVDS MODULE ANPR camera processor Module	1	Nos	VENDOR	55000	55000
b	Lane ANPR Camera sensor with Lens assembly	1	Nos	VENDOR	85000	85000
c	MSVDS SYSTEM CONTROLLER with Industrial Switch	1	Nos	VENDOR	175000	175000
d	Pulsed Power-IR Flash UNIT: 600 W peak power	1	Nos	VENDOR	85000	85000
e	SBC & LCD Panel USER interface Module	1	Nos	VENDOR	150000	150000
f	4G Industrial modem – Router with LAN module	1	Nos	VENDOR	18000	18000

g	3D Radar with Radar Interface Sub Module	1	Nos	VENDOR	686000	686000
h	MSVDS Pan & TILT assembly	1	Nos	VENDOR	70000	70000
Keltron Purchased components for Manufacturing						
i	80 AH LiFePo4 Battery	1	Nos	KELTRON	22000	22000
j	Aluminium Enclosure With Carrying Handle - Imported)	1	Nos	KELTRON	10615	10615
k	Aluminium Mounting Plate for MS/MSN, L Bracket- (Imported)	2	Nos	KELTRON	1716	3432
l	Carrying Handle (Imported)	1	Set	KELTRON	283	283
m	Storage SSD 256 GB	1	Nos	KELTRON	4300	4300
n	Cooling fan	1	Nos	KELTRON	671	671
o	20 A Battery Charger	1	Nos	KELTRON	9500	9500
p	4G SMA Antina	1	Nos	KELTRON	175	175
q	Mil standerd Cables and Connectors	1	Nos	KELTRON	5084	5084
r	Mounting and Testing expenses	1	Nos	KELTRON	21000	21000
s	Vehicle Modification expenses	1	Nos	KELTRON	70940	70940
t	Vehicle Purchase on road cost	1	Nos	VENDOR	850000	850000
u	Comprehensive Warranty Support for three years including Vehicle	3	Nos	VENDOR	186000	558000
TOTAL					2880000	140000

MSVDS ANPR GLOBAL SHUTTER CAMERA PRICE

3 RED VIOLATION DETECTION SYSTEM						
a	RLVDS MODULE Industrial Switch	1	Nos	VENDOR	29800	29800
b	Sub Module: Violation NVR MODULE	1	Nos	VENDOR	68500	68500
c	AC Power supply and UPS MODULE	1	Nos	VENDOR	44700	44700
d	AC Power Control & Power Conditioning MODULE	1	Nos	VENDOR	37800	37800
e	Processor Sub Module	1	Nos	VENDOR	97500	97500
f	VPU – virtual line crossing detection MODULE	1	Nos	VENDOR	80000	80000
g	Lane ANPR camera processor Module	2	Nos	VENDOR	55000	110000
h	Lane ANPR Camera sensor with Lens assembly MODULE	2	Nos	VENDOR	80000	160000

i	EVIDENCE CAMERA processor Module	1	Nos	VENDOR	45500	45500
j	Evidence Camera sensor with Lens assembly MODULE	1	Nos	VENDOR	68000	68000
k	Pulsed Power IR Flash UNIT : 250W peak power	2	Nos	VENDOR	67000	134000
l	Keltron Purchased components for Manufacturing					
m	256GB SSD for Storage	1	Nos	KELTRON	4350	4350
n	Customised Cabinet with Fan for temperature control	1	Nos	KELTRON	15000	15000
o	42 AH Led Acid Battery	1	Nos	KELTRON	2850	2850
p	Anti-tamper System	1	Nos	KELTRON	850	850
q	Mill standered connectors and cables for FHU	1	Set	KELTRON	5000	5000
r	Camera Housing (Imported)	3	Nos	KELTRON	3250	9750
s	Camera Canopy	3	Nos	KELTRON	600	1800
t	Camera Mounting Accessories	3	Set	KELTRON	1360	4080
u	Precision Cooling Fan for Camera	3	Nos	KELTRON	671	2013
v	Mill standered connectors and cables for Camera	3	Set	KELTRON	1495	4485
	Manufacturing Charges includes					
x	a) Technical Manpower for QA Inward Inspection, In process Inspection, Final Product Inspection, Assembly, Testing, Burn in Testing and consumable Expenses	1	Set	KELTRON	12000	12000
	FIELD INSTALLATION Includes					
y	Cantilever Structure Fabrication for 2/3 Lanes	1	Nos	VENDOR	150000	150000
z	Basement with RCC and Cantilever Mounting Structure	1	Nos	VENDOR	42700	42700
aa	Power Connection Charges	1	Nos	VENDOR	31450	31450
	Industrial Earthing	2	Nos	VENDOR	9500	19000
ab	Transportation from Keltron Unit (Enforcement System) to District Storage area	1	Nos	VENDOR	1500	1500
ac	Transportation from District Storage area to Site	1	Nos	VENDOR	1000	1000
ad	Cantilever Transportation from Fabrication site to installation site	1	Nos	VENDOR	25000	25000
ae	Loading and Unloading expense for Enforcement system & Cantilever Structure	1	Nos	VENDOR	16000	16000
af	Installation & Commissioning	1	Nos	VENDOR	20000	20000
ag	Onsite Comprehensive Warranty Support for three years(5% per year)	1	Nos	VENDOR	65400	65400

TOTAL	1310027
3 ARM JN.	3930080

RLVDS GLOBAL SHUTTER ANPR CAMERA PRICE	142376
RLVDS GLOBAL SHUTTER EVIDANCE WIDE ANGLE CAMERA PRICE	120876

4		AI CAMERA SYSTEM 3 MP				
a	Lane ANPR camera processor Module	1	Nos	VENDOR	55000	55000
b	Lane ANPR Camera sensor with Lens assembly	1	Nos	VENDOR	75000	75000
c	VPU SUB SYSTEM MODULE	1	Nos	VENDOR	110000	110000
d	Pulsed Power IR Flash UNIT : 600 W peak power	1	Nos	VENDOR	85000	85000
e	4G Industrial modern – Router with LAN MODULE	1	Nos	VENDOR	18000	18000
f	Keltron Purchased components for Manufacturing					
g	AI System Enclosure	1	Nos	KELTRON	6200	6200
h	Fan & Accessories	1	Nos	KELTRON	800	800
i	Storage SSD 256 GB	1	Nos	KELTRON	4300	4300
j	4G SMA Antina	1	Nos	KELTRON	175	175
k	LiFePo4 80 AH , with BMS & Enclosure	1	Nos	KELTRON	17050	17050
l	Anti-tamper System	1	Nos	KELTRON	850	850
m	Camera Housing with Bracket (Imported)	1	Set	KELTRON	2750	2750
n	Canopy	1	Nos	KELTRON	500	500
o	Micro cooling Fan	1	Nos	KELTRON	671	671
p	Mil Standered Cables and Connectors	1	Set	KELTRON	1200	1200
r	Solar Panel for Power source	2	Nos	KELTRON	4500	9000
	Manufacturing Charges includes					
s	a) Technical Manpower for QA Inward Inspection, In process Inspection, Final Product Inspection, Assembly, Testing, Burn in Testing and consumable Expenses	1	Set	KELTRON	6000	6000
	FIELD INSTALLATION Includes					
t	Pole with Solar frame structure Manufacturing	1	Nos	VENDOR	24000	24000
u	Transportation from Keltron Unit (Enforcement System) to District Storage area	1	Nos	VENDOR	1000	1000

v	Transportation from District Storage area to Site	1	Nos	VENDOR	1000	1000
w	Camera pole Transportation from Fabrication site to installation site	1	Nos	VENDOR	2000	2000
x	Loading and Unloading expense for AI Enforcement system & Camera pole Structure	1	Nos	VENDOR	1200	1200
y	Industrial Earthing	1	Nos	VENDOR	9500	9500
z	Installation & Commissioning	1	Nos	VENDOR	6000	6000
aa	Onsite Comprehensive Warranty Support for three years(5% per year)	3	Nos	VENDOR	9500	28500
TOTAL					465696	

3 MP GLOBAL SHUTTER AI CAMERA PRICE **133921**

AI CAMERA SYSTEM 5 MP						
5						
a	AI CAMERA (5 MEGA PIXEL) Lane ANPR camera processor Module	1	Nos	VENDOR	55000	55000
b	Lane ANPR Camera sensor with Lens assembly	1	Nos	VENDOR	90000	90000
c	VPU SUB SYSTEM MODULE	1	Nos	VENDOR	110000	110000
d	Pulsed Power IR Flash UNIT : 600W peak power	1	Nos	VENDOR	85000	85000
e	4G industrial modem – Router with LAN MODULE	1	Nos	VENDOR	18000	18000
Keltron Purchased components for Manufacturing						
f	AI System Enclosure	1	Nos	KELTRON	6200	6200
g	Fan & Accessories	1	Nos	KELTRON	800	800
h	Storage SSD 256 GB	1	Nos	KELTRON	4300	4300
i	4G SMA Antina	1	Nos	KELTRON	175	175
j	LiFePo4 80 AH, with BMS & Enclosure	1	Nos	KELTRON	17050	17050
k	Anti-tamper System	1	Nos	KELTRON	850	850
l	Camera Housing with Bracket (Imported)	1	Set	KELTRON	2750	2750
n	Canopy	1	Nos	KELTRON	500	500
o	Mil Standered Cables and Connectors	1	Set	KELTRON	3600	3600
p	Micro cooling Fan	1	Nos	KELTRON	675	675
r	Solar Panel for Power source	2	Nos	KELTRON	4500	9000

Manufacturing Charges includes							
a	a) Technical Manpower for QA Inward Inspection, In process Inspection, Final Product Inspection, Assembly, Testing, Burn in Testing and consumable Expenses	1	Set	KELTRON	8000	8000	
b	FIELD INSTALLATION Includes						
c	Transportation from Keltron Unit (Enforcement System) to District Storage area	1	Nos	VENDOR	1000	1000	
d	Transportation from District Storage area to Site	1	Nos	VENDOR	1000	1000	
e	Camera pole Transportation from Fabrication site to installation site	1	Nos	VENDOR	2000	2000	
f	Loading and Unloading expense for AI Enforcement system & Camera pole Structure	1	Nos	VENDOR	1200	1200	
g	Industrial Earthing	1	Nos	VENDOR	9500	9500	
h	Installation & Commissioning	1	Nos	VENDOR	7500	7500	
i	Onsite Comprehensive Warranty Support for three years(5% per year)	3	Nos	VENDOR	15460	46380	
TOTAL					480480		

5 MP GLOBAL SHUTTER AI CAMERA**148925**

AI CAMERA SYSTEM - PARKING							
6							
a	PTZ AI Based ANPR Based IR camera - 30 X	1	Nos	VENDOR	175000	175000	
b	VPU SUB SYSTEM MODULE	1	Nos	VENDOR	130000	130000	
c	4G Industrial modem - Router with LAN MODULE	1	Nos	VENDOR	18000	18000	
Keltron Purchased components for Manufacturing							
d	AI System Enclosure	1	Nos	KELTRON	7275	7275	
e	Fan & Accessories	1	Nos	KELTRON	800	800	
f	Storage SSD 256 GB	1	Nos	KELTRON	4300	4300	
g	4G SMA Antina	1	Nos	KELTRON	175	175	
h	LifePo4 , with BMS & Enclosure	1	Nos	KELTRON	51930	51930	
i	Anti-tamper System	1	Nos	KELTRON	850	850	

j	Mill Standarded Cables and Connectors	1	Set	KELTRON	2500	2500
k	Industrial Earthing	1	Nos	KELTRON	1900	1900
l	Power Connection Charges	1	Nos	KELTRON	7600	7600
Manufacturing Charges includes						
m	a) Technical Manpower for QA Inward Inspection, In process Inspection, Final Product Inspection, Assembly, Testing, Burn in Testing and consumable Expenses	1	Set	VENDOR	7000	7000
n	Transportation from Keltron Unit (Enforcement System) to District Storage area	1	Nos	VENDOR	600	600
o	Transportation from District Storage area to Site	1	Nos	VENDOR	835	835
p	Camera pole Transportation from Fabrication site to installation site	1	Nos	VENDOR	14000	14000
q	Loading and Unloading expense for AI Enforcement system & Camera pole Structure	1	Nos	VENDOR	3500	3500
r	Installation & Commissioning	1	Nos	VENDOR	15000	15000
s	Onsite Comprehensive Warranty Support for three years(5% per year)	3	Nos	VENDOR	18000	54000
TOTAL					495265	

30X PTZ CAMERA AI CAMERA PRICE**175000**

CENTRAL CONTROL ROOM						
7						
a	CENTRAL CONTROL ROOM- Server	22	Nos	VENDOR	724500	15939000
b	Storage - 48 TB	5	Nos	VENDOR	1900000	9500000
c	Tape Drive & Backup Software	1	Nos	VENDOR	3500000	3500000
d	Desktop computers	8	Nos	VENDOR	60000	480000
e	ANPR Desktop computers	10	Nos	VENDOR	85000	850000
f	SAN Switch	2	Nos	VENDOR	670000	1340000
g	CORE SWITCH	2	Nos	VENDOR	2300000	4600000
h	10G SFP+ SINGLE MODE TRANSCEIVERS	1	Ls	VENDOR	400000	400000
i	16Gb FC/10GbE 100m SFP+ Transceiver	1	Ls	VENDOR	600000	600000




j	24/28 PORT GBE WEB MANAGED L2 ACCESS SWITCH WITH 4 SFP PORTS	2	Nos	VENDOR	60000	120000
k	24/28 PORT GBE L2 POE+ ACCESS SWITCH HAIVING 4 SFP PORTS	2	Nos	VENDOR	113100	226200
l	NEXT GENERATION UTM-FIREWALL	2	Nos	VENDOR	1950000	3900000
m	NAS Storage System 48 TB	1	Nos	VENDOR	750000	750000
n	Central Control Room Design Set up , configuration adcommissioning	1	Nos	VENDOR	9500000	9500000
o	Attendance and Access Control system at Central Control room	15	Nos	VENDOR	50000	750000
p	GENERATOR...150/160 KVA	1	Nos	VENDOR	1500000	1500000
q	U P S.....60 KVA	2	Nos	VENDOR	1200000	2400000
r	Central CONTROL ROOM BUILD UP & INTERIOR	1	Nos	VENDOR	19424000	19424000
s	Connectivity for Central Control Room - Main Connectivity	1	Nos	VENDOR	718550	718550
t	Connectivity for Central Control Room - Reddened Connectivity	1	Nos	VENDOR	308915	308915
u	PRECISION COOLING SYSTEM AND RACK FOR CENTRAL CONTROL ROOM	1	System	VENDOR	1900000	1900000
v	CCTV system at Central Control room	1	System	VENDOR	700000	700000
w	FIRE and SAFETY SYSTEM AT CENTRAL CONTROL ROOM	1	System	VENDOR	1200000	1200000
x	Unforcene expences	1	Lum	VENDOR	4100000	4100000
y	Onsite support - L2 engineer for three years	3	Year	VENDOR	1800000	5400000
z	Onsite Comprehensive Warranty Support for three years(5% per year)	3	Lum	VENDOR	400000	1200000
TOTAL					91306665	91306665

8 DISTRICT CONTROL ROOM						
	DISTRICT CONTROL ROOM- District Control Room Build Up & Interior	1	Nos	VENDOR	5550000	5550000
	CCTV System at District Control room	1	Nos	VENDOR	125000	125000
	Attendance Management system at District Control Room	1	Nos	VENDOR	120000	120000
	Onsite Comprehensive Warranty Support for three years(5% per year)	3	Year	VENDOR	23889	71667

TOTAL 5866667

9	Laptops	360	Nos	VENDOR	80000	80000
10	DESKTOP computers	130	Nos	VENDOR	64000	64000
11	Heavy Duty Printer	16	Nos	VENDOR	320000	320000
12	6 KVA Online UPS	16	Nos	VENDOR	373333	373333
13	48 PORT GIGABIT SWITCH	15	Nos	VENDOR	64000	64000
14	Firewall	15	Nos	VENDOR	213333	213333
15	CENTRAL: CONTROL ROOM S/W					
a	CENTRAL CONTROL ROOM SOFTWARE INCLUDES APPLICATIONS & LICENCES AND SYSTEM DEVICE MANAGER	1	Nos	VENDOR	6500000	6500000
b	Offence Image Server Manager	8	Nos	VENDOR	1400000	11200000
c	ANPR SW LICENCES	748	Nos	VENDOR	17500	13090000
d	Challan Processing Server Application	1	Nos	VENDOR	9593330	9593330
e	VAHAN Integration Modules	1	Nos	VENDOR	6000000	6000000
f	Payment Management Solution	1	Nos	VENDOR	7000000	7000000
g	AI SW license for violation detection	700	Nos	VENDOR	45000	31500000
h	HR management software (Main & district control rooms)	15	Nos	VENDOR	30000	450000
TOTAL					85333330	85333330

AMC FOR 4TH & 5TH YEAR							
16	a	AMC FOR 4th YEAR	1	Nos	VENDOR	44000000	44000000
	b	AMC FOR 5th YEAR	1	Nos	VENDOR	44000000	44000000

FACILITY MANAGEMENT WORK SHEET

Sl.	ITEM	QTY	Quoted Price (Monthly)	Actual (Monthly)	Yearly Quoted	Yearly Estimated value	5 Year Quoted	5 Year Estimated	5 Year including GST 19%	Profit %
1	Central C R Manager	2	34000	30000	816000	720000	4080000	3600000	4855200	13.33
2	System Admn	16	28370	25000	5447040	4800000	27235200	24000000	32409888	13.48
3	C R Supervisor	14	26500	24000	4452000	4032000	22260000	20160000	26489400	10.42
4	Operator	84	24500	21000	24696000	21168000	123480000	105840000	146941200	16.67
5	Helper	14	18500	17000	3108000	2856000	15540000	14280000	18492600	8.82
6	Driver cum Operator	16	24500	22000	4704000	4224000	23520000	21120000	27988800	11.36
7	Diesel Expences	4	94792	81250	4550016	3900000	22750080	19500000	27072595.2	16.67
8	CCR Power Charge	1	95000	90000	1140000	1080000	5700000	5400000	6783000	5.56
9	CCR L Line -II	1	260000	220000	3120000	2640000	15600000	13200000	18564000	18.18
10	CCR L Line -II	1	56000	48500	672000	582000	3360000	2910000	3998400	15.46
11	DCR L Line	13	29000	25000	4524000	3900000	22620000	19500000	26917800	16.00
12	DCR POWER CHARGE (4)	4	24275	22100	1165200	1068000	5826000	5304000	6932940	9.84
13	Diesel charges for Generator	1	11667	10000	140004	120000	700020	600000	833023.8	16.67
14	Power Charges for RLVDS	6	2500	2100	180000	151200	900000	756000	1071000	19.05
15	Power Charges for SVDS	4	1900	1600	91200	76800	456000	384000	542640	18.75
16	Internet Charges for RLVDS	4	2000	1850	144000	133200	720000	666000	856800	8.11
17	Internet Charges for SVDS	4	2000	1850	144000	133200	720000	666000	856800	8.11
18	Internet Charges for Mob. SVDS	4	2200	1850	105600	88800	528000	444000	628320	18.92
19	Internet Charges for AI Cameras	700	350	320	2940000	2688000	14700000	13440000	17493000	9.38
20	Chellan Processing charge	208333	20	17	49999920	42499932	249999600	212499660	297499524	17.65
21	Vehicle Maintanance	4	7917	6500	380016	312000	1900080	1560000	2261095.2	21.80
						562354980	485607660	669202426.2	15.80	

TOTAL ESTIMATED FMS COST IS RS562354980/-
TOTAL QUOTED VALUE IS RS669202426/-
OVER ALL PROJECT MARGIN FOR FMS = 15.8%

(This calculation is based on the present minimum wages)

ESTIMATED CASH FLOW STATEMENT - 6 + YEARS

PERIOD	Y1-Q1	Y1-Q2	Y1-Q3	Y1-Q4	Y2-Q1	Y2-Q2	Y2-Q3	Y2-Q4	Y3-Q1	Y3-Q2	Y3-Q3	Y3-Q4	Y4-Q1	Y4-Q2	Y4-Q3	Y4-Q4	Y5-Q1	Y5-Q2	Y5-Q3	Y5-Q4	Y6-Q1	Y6-Q2	Y6-Q3	Y6-Q4	TOTAL
INVESTMENT BY INVESTOR	31.72	33	14.78	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2	0	0	0	4.2	0	0	0	87.9
RETURN FROM GOVERNMENT					11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	235.8
RETURN TO SI (20 QUARTERLY INSTALLMENTS)					7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	149
RETURN TO KETRON/ 20 QUARTERLY INSTALLMENTS)					4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	86.8
TOTAL AMOUNT INCLUDING PRINCIPAL AMOUNT + INTEREST+ SI	31.72	66.39	84.651	89.09	86.32	83.4	80.333	77.1	73.7	70.12	66.35	62.38	58.21	53.812	49.188	44.32	43.397	38.23	32.782	27.053	25.22	19.097	12.65	5.8642	
INTEREST@ 3% PER Qtr -SI	0.952	1.992	2.5395	2.673	2.59	2.502	2.41	2.313	2.211	2.104	1.99	1.871	1.746	1.6144	1.4756	1.3296	1.3019	1.147	0.9835	0.8116	0.757	0.5729	0.3795	0.1759	38.44
PROFIT & RISK @ 2.25%PER Qtr. -SI	0.714	1.494	1.9046	2.005	1.942	1.877	1.8075	1.735	1.658	1.578	1.493	1.404	1.31	1.2108	1.1067	0.9972	0.9764	0.86	0.7376	0.6087	0.568	0.4297	0.2846	0.1319	28.83
SI Quarterly Balance	33.39	69.87	89.095	93.77	90.85	87.78	84.55	81.15	77.57	73.8	69.83	65.66	61.26	56.638	51.77	46.647	45.675	40.23	34.503	28.473	26.55	20.1	13.314	6.1721	

* total Capex value = 66.81Cr, GST and Cess @18+1% =12.69 Cr, Security deposit = 6Cr.
 TOTAL SI RETURN FROM QUARTERLY PAYMENTS - 6th year = 149Cr
 SECURITY DEPOSITE FROM KETRON 1st QUARTER OF 7th Year = 6Cr.
 SI TOTAL RETURN = 155 Cr

Verified with the working sheets provided.