Ref. Ares(2024)4115248 - 07/06/2024

# *ANNEX II + III:* TECHNICAL SPECIFICATIONS + TECHNICAL OFFER

**Contract title: Supply of Equipment for Public Transportation Gets Smarter in Denizli** **p 1 /…**

**Publication reference:** EC-NEAR/ANK/2024/EA-OP/0045

**Columns 1-2 should be completed by the contracting authority**
**Columns 3-4 should be completed by the tenderer**
**Column 5 is reserved for the evaluation committee**

Annex III - the contractor's technical offer

The tenderers are requested to complete the template on the next pages:

- Column 2 is completed by the contracting authority shows the required specifications (not to be modified by the tenderer),
- Column 3 is to be filled in by the tenderer and must detail what is offered (for example the words ‘compliant’ or ‘yes’ are not sufficient)
- Column 4 allows the tenderer to make comments on its proposed supply and to make eventual references to the documentation

The eventual documentation supplied should clearly indicate (highlight, mark) the models offered and the options included, if any, so that the evaluators can see the exact configuration. Offers that do not permit to identify precisely the models and the specifications may be rejected by the evaluation committee.

The offer must be clear enough to allow the evaluators to make an easy comparison between the requested specifications and the offered specifications.

The Tenderer should avoid copying the specifications required from Column 2 to specifications offered in Column 3. Column 3 shall be filled by the Tenderer with the exact/real specification of the offered goods (not the range or the min. max. threshold provided in the specifications). For instance, if the required specification is “length between 100 and 120cm”, the specification offered shall be i.e. “110cm or 110cm ±2”. Offers that do not permit to identify clearly and precisely the existence of the items with all the proof documents and/or certifications requested through this annex may be rejected by the evaluation committee.

## GENERAL REQUIREMENTS

### 1. General requirements applying to all of the items:

**1.1.** All equipment and deliverables must be provided complete with the necessary accessories and/or parts to ensure that the unit is capable of operating to the required technical and quality specifications immediately.

**1.2.** The contractor is fully responsible for proper connections of supplied items to existing infrastructure for smooth installation and operation.

**1.3.** Offered supplies must be in full compliance with each functional partner. Any interoperability problems between software and hardware –if applicable must be resolved by the Contractor at no additional cost to the Contracting Authority.

**1.4.** The type of supplied voltage in Türkiye is 220 V (monophase) and 380 V (tri phase + neutral). The quality and stability of the supplied current may undergo fluctuations (+ and -) of more than 10%. All hardware must operate on 220 V ± 20 V, 50 Hz ± 0.5 Hz, or 380 V ± 40 V, power supply and be suitable for direct connection to the standard power outlets in Türkiye. The type of electrical outlets generally installed in Türkiye is the type with 2 side mounted earthing poles (EUROPLUG). All plugs of all goods will have to fit exactly. The contractor shall evaluate the supplied current, the quality of the current and the fluctuations of the current and take the necessary precautions to avoid damages to the equipment.

**1.5.** The supplies must be compliant with CE standards. Wherever reference is made in the technical specifications to specific standards and codes to be met, provisions of the latest edition or revision of the relevant standards in effect, shall apply, unless otherwise stated in this technical specification.

**1.6.** The supplies should comply with the regulations concerning safe operation, energy saving and environmental safety, in line with the policies or the practical measures in use within the EU and Türkiye.

**1.7.** Tenderers are required to provide screenshots as a proof for meeting the technical requirements concerning software specifications for all software items or items that include software and explicit functions specified under the equipment.

**1.8.** The Contractor will be responsible for providing measures for any Health & Safety risks associated with equipment provided and that this equipment shall also comply with occupational health and safety standards. Evaluation Committee may further request additional information/confirmation for the standards.

**1.9.** Unless otherwise specified in the technical specifications, all supplies must be suitable for operation in the climatic conditions in place of delivery (Denizli).

**1.10.** For warranty and after-sales services the Contractor shall comply with the special and general conditions Article 32 and 33, and After Sales Services Regulation of Turkish Law as published on Official Gazette no.29029 dated 13.06.2014. Upon completion of warranty period, there may be a service contract. The contractor shall offer a service contract option.

**1.11.** Only original or approved by the manufacturer(s) spare parts shall be used in any repair service.

## 2. Technical Documents to be provided during the implementation period

**2.1.** All supplies must be supplied with appropriate documentation (i.e. original set of operating and users' manuals developed by the vendor, instructions for routine use and maintenance procedure) in English and in Turkish (if commercially available). If manuals are not in Turkish, a "Quick Guide" in Turkish shall be supplied together with the manual where applicable. Manuals shall also be supplied as electronic copy.

**2.2.** No provisional acceptance can be issued without the presence of the complete set of documents. The obligatory documents for the provisional acceptance:

**2.2.1.** Original certificate of origin by Chamber of Commerce

"A special Turkish Good Certificate must be used since 01.05.2013 for the contracts within the scope of Instrument for pre-accession (IPA) funds according to the 11.04.2013 dated and 033 numbered memorandum of Confederation of Turkish Tradesmen and Craftsmen. For more information please visit the following website: http://www.tesk.org.tr/tr/mevzuat/13/genelge_detay.php?id=61

**2.2.2.** Copy of the certificates showing that the equipment is compliant with the required norms, directives and standards (CE, TSE etc.) and/or technical requirements

**2.2.3.** Commercial warranty document of the manufacturer and/or authorized dealer/distributor of manufacturer

**2.2.4.** Operation and maintenance manuals and maintenance plans together with drawings (if required), together with the following documents.

- On-site fault diagnostic technique;
- Possible remote fault diagnostic techniques;
- Average time to arrive on-site at each system site (maximum 48 hours);
- Mean time to repair major system components (maximum 30 days);
- Fault escalation procedures;
- Supplier/distributor maintenance support facilities in the delivery location;
- Maintenance logs and End Recipients of Assistance (ERA)'s official authorization.

## 3. Installation and Commissioning of Supplies

**3.1.** The goods must be delivered with all materials and any other auxiliary equipment or tools essential for immediate and complete operation.

**3.2.** Full assembly and complementary services related to the installation and put into operation will be borne by the Contractor. Connection to main electrical, mechanical, water, air and/or gas supplies from the equipment to the existing infrastructure of the building shall be done by Contractor according to the rules and regulations of Türkiye. All costs related to the installation and put into operation (cabling, set-up, assembly etc.) will be included in the financial offer. Recovering any damage to building structure that may occur during the installation of goods is under the responsibility of the Contractor. With this regard, if any demounting on the workshop door and sides of the walls are required due to the dimensional specification of the

machine for proper and safe entry to building, it is under the responsibility of Contractor to realise such work and repair any damages to the building after the installation. After contract signature, the contractor shall provide information for the layout of the floor mounted machinery with dimensions and position of the machine, design of the interface between the machine and the foundation and data of dynamic / static loads that act on the foundation. Contractor shall be responsible for infrastructure, foundations and positioning of the machinery.

**3.3.** Contractor shall make available to himself all tools, materials and equipment required for in-house transport, assembling and installation.

**3.4.** Contractor shall perform starting-up of the equipment, furnishing of all required materials such as consumables and/or raw materials needed for testing and initial operation of goods supplied.

**3.5.** The Contractor is fully responsible for the validation of process of the equipment. All functions described in TS documents shall be tested before training.

**3.6.** All the software must be installed and delivered in CD-ROM or DVD or USB including the electronic version of the documentation and all accessories shall be original and compatible with supplies. All software must be licensed to the End Recipient of Assistance (ERA). Open source or any limited licensed software shall not be offered by Tenderers.

## 4. Health and Safety

**4.1.** The contractor shall be fully responsible for applying the Health and Safety procedures in accordance with the legislation published by Republic of Türkiye, Ministry of Labor and Social Security during the manufacturing, delivering, assembling, installation, commissioning and testing. Moreover, the contractor shall be responsible for advising Denizli Metropolitan Municipality and the Contracting Authority of any Health and Safety risks associated with supplies provided and suitable protective measures.

**4.2.** Supplies shall be designed to operate safely taking into account the characteristics of the terrain and its surroundings, atmospheric and meteorological conditions, any possible structures and obstacles located in the vicinity either on the ground or in the air in such a way as to cause no nuisance or pose no danger under operation or servicing conditions or in the event of an operation to rescue persons.

## 5. Training Requirements

**5.1.** Following installation and commissioning of supplies, the contractor shall provide trainings for Denizli Metropolitan Municipality staff.

**5.2.** The tenderers shall include in their offer a training plan according to requirements in this Technical Specifications (duration, topics provided in tables hereunder are requested as minimum). The contractor (if required) may extend training durations and topics covered.

**5.3.** Trainings shall be realized in Turkish or English with simultaneous translation when necessary.

**5.4.** Trainings shall be provided by qualified instructors.

**5.5.** All necessary accessories, materials and documentation for the trainings shall be provided by the contractor.

**5.6.** Unless otherwise required, trainings shall be realized in Denizli Metropolitan Municipality facilities in Türkiye.

**5.7.** The trainings shall be recorded by the contractor and provided as a separate media to the Denizli Metropolitan Municipality for future use.

| Lot/Item No. | Description of the Item | Content of the Training | Min Number of Training days | Max Number of Participants |
|---|---|---|---|---|
| 2.1 | Passenger Information System | The training shall include theoretical and applied training. The training shall cover topics including but not limited to:<br>• Overview and terminology,<br>• Basic usage training,<br>• User interface and software,<br>• Installation, assembly<br>• Maintenance and troubleshooting. | 2 | 15 |
| 2.4 | Passenger Counting System | | 2 | 15 |
| 3.1 | Traffic Modelling and Simulation Software | | 3 | 15 |

## 6. Warranty requirements

**6.1.** Please refer to Article 32 and Article 33 of Special and General Conditions of the Contract and Warranty Regulation of Turkish Law as published on Official Gazette no.29029 dated 13.06.2014.

**6.2.** Only original or approved by the manufacturer(s) spare parts should be used in any repair service.

**6.3.** The contractor shall provide available software updates during the warranty period.

**6.4.** For Lot 1, the tenderer shall provide a list of spare parts for informative purposes only.

## 7. Visibility Label Requirements

**7.1.** Label shall be designed in accordance with the following sign without any distortion.

**7.2.** Proper material and size compatible with specifications and dimensions of supplies shall be offered by Contractor and approved by Contracting Authority.

**7.3.** Label shall be coloured, readable, visible and durable.



This programme is financed by the
European Union and the Republic of Türkiye

Purchased within the framework of "xxxxx" Project
financed by European Union and the Republic of Türkiye

Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilen
"xxxxx Projesi" kapsamında satın alınmıştır.

| | |
|---|---|
| Contract No | |
| Item / Birim No | |
| Fixed Asset / Demirbaş No | |








**LOT - 1: OFFICE-USE EQUIPMENT AND SOFTWARE**

This Lot includes equipment and software to be used in the Denizli Metropolitan Municipality (DMM) Transportation Management Centre. Installations of equipment and networking shall be made by the contractor. All the hardware and software will be installed and know-how services shall be provided by the contractor.

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.1.** | **Desktop Computer** | | | |
| | **Quantity: 11** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **1.1.1.** | The desktop computer shall be of tower type and shall have at least 4x120mm fans on board. | | | |

<table>
<tr><th>1.<br><br>Item number</th><th>2.<br><br>Specifications required</th><th>3.<br><br>Specifications offered</th><th>4.<br><br>Notes, remarks, ref to documentation</th><th>5.<br><br>Evaluation committee’s notes</th></tr>
<tr><td>1.1.2.</td><td>The desktop computer shall have a CPU;<ul><li>with at least 12 total number of cores combining both performance and efficient ones,</li><li>with minimum 20 threads,</li><li>with integrated graphics unit</li><li>with 25 MB of cache,</li><li>with support of DDR5 memory up to 128GB,</li><li>with cores having minimum base and max turbo frequencies according to the table below.</li></ul><table><tr><th></th><th>Base Frequency</th><th>Max Turbo Frequency</th></tr><tr><td>Efficient Core</td><td>2.70 GHz</td><td>3.80 GHz</td></tr><tr><td>Performance Core</td><td>3.60 GHz</td><td>4.90 GHz</td></tr></table><ul><li>The CPU should be cooled with a liquid cooler of minimum 240 in size.</li></ul></td><td></td><td></td><td></td></tr>
<tr><td>1.1.3.</td><td>The desktop computer shall have a dual channel DDR5 memory of minimum 32GB(2 x 16) operating at frequency of minimum 6000MHz.</td><td></td><td></td><td></td></tr>
</table>

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.1.4.** | The desktop computer shall have a high performance Graphic Processing Unit (GPU) with the following specifications;<br>• At least 12 GB GDDR6<br>• Capable of Ray Tracing Technology,<br>• Using PCI Express 4 Technology or newer for Graphic Bus,<br>• Number of cuda cores shall be minimum 3328,<br>• Standard clock frequency of minimum 1,3 GHz,<br>• Boost Clock Frequency of minimum 1,73GHz,<br>• Support up to 4 monitors,<br>• Memory interface width of 192 Bit or higher. | | | |
| **1.1.5.** | The desktop computer shall have a Solid State Drive(SSD) with the specifications of;<br>• At least 256GB capacity,<br>• Shall be a PCI Express Gen 4 SSD with minimum 3500/1900Mb/s read/write parameters | | | |
| **1.1.6.** | The desktop computer shall have an internal 7200 RPM Hard Disk Drive (HDD) with at least 1TB storage capacity. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.1.7.** | The desktop computer shall be supplied with the following accessories:<br>• 1 x USB Camera with built in microphone, min resolution 1080p at 30fps, 90° tilt-adjustable clip, 360° rotation mechanism.<br>• 1 x USB headset. | | | |
| **1.1.8.** | The desktop computer shall be supplied with two identical 2K monitors, each of which having the specifications of;<br>• Screen size shall be at least 23 inches,<br>• Shall be an IPS type with a maximum response time of 1ms and minimum refresh rate of 144Hz.<br>• The brightness of the monitor shall be minimum 350 cd/$m^2$.<br>• Shall have at least 1 HDMI ports and 1 Display Port.<br>• Shall be adjustable by means of height, back-front bending, and rotatable around its axis.<br>• Shall be VESA compatible. | | | |
| **1.1.9.** | The desktop computer shall have USB Traditional Q Keyboard - Turkish (179) and optical mouse | | | |
| **1.1.10.** | The desktop computer shall have the latest version of 64-bit Windows 11 Pro or equivalent, installed as the operating system. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.1.11.** | The desktop computer shall have the following Ports/Slots as minimum:<br>• 3 x USB 3.2,<br>• 1 x USB Type C,<br>• 1 x HDMI,<br>• 1 x DP,<br>• 1 x headphone/microphone combo,<br>• 1 x Ethernet RJ 45. | | | |
| **1.1.12.** | The motherboard should be capable of working with all the desired components specified above and supporting them to their full potential without any problem or performance loss. The motherboard should have following specifications as minimum:<br>• 2xM2 Slots<br>• PCI Express 5 support<br>• 4xSata 6Gb/s<br>• Lan Speed up to 2500mb/s<br>• DDR5 Support of minimum 6000MHz. | | | |
| **1.1.13.** | The desktop computer shall have an 80+ certified power supply with minimum 700W power. | | | |
| **1.2.** | **Laptop** | | | |
| | **Quantity: 5** | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **1.2.1.** | The laptop processor shall have the following specifications;<br>• Minimum 14 cores combining both performance and efficient cores together with 20 threads in total.<br>• Max turbo frequency of processor shall be minimum 4.90 GHz.<br>• Shall have minimum 24MB of cache.<br>• Shall support DDR5 memory type up to 128GB.<br>• Shall support dual channel memory technology.<br>• Shall have an integrated graphics unit.<br>• Shall support PCI Express 5.0 technology. | | | |
| **1.2.2.** | The laptop shall have a dual channel 32GB (2x16) DDR5 memory. | | | |
| **1.2.3.** | The laptop shall have a M2 SSD with minimum capacity of 1TB. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.2.4.** | The laptop shall have a high performance graphics processing unit (GPU) with the following specifications;<br>• Shall have min 8GB GDDR6 VRAM,<br>• Shall have ray tracing technology,<br>• Standard and boost clock frequencies of the GPU shall be 1470 – 2370 MHz minimum respectively.<br>• Shall have minimum 3072 Cuda Cores.<br>• Memory interface width shall be 128 bit.<br>• Shall be compatible with the DLSS 3 technology. | | | |
| **1.2.5.** | The laptop screen size shall be minimum 15 inches, QHD in resolution and IPS type. | | | |
| **1.2.6.** | The laptop shall have Turkish Q format keyboard with backlight. | | | |
| **1.2.7.** | The Laptop shall have the following ports;<br>• At least 1x HDMI 2.1 port,<br>• At least 2x USB 3.1 or newer,<br>• 1 x headphone/microphone combo,<br>• 1 x SD Card Reader. | | | |
| **1.2.8.** | The Laptop shall be supplied with no operating systems installed. | | | |
| **1.2.9.** | The laptop shall have Wi-Fi 6 technology, | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.2.10.** | The Laptop shall have at least a 720p resolution camera(HD) and a built in microphone. | | | |
| **1.2.11.** | The Laptop shall be supplied with a standard wireless mouse. | | | |
| **1.2.12.** | The wireless Laptop shall be supplied with a carrying case. | | | |
| **1.3.** | **Colour Printer** | | | |
| | **Quantity: 1** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **1.3.1.** | The printer shall have key features of Print, Scan, Copy and Fax integrated all in one machine. | | | |
| **1.3.2.** | The printer shall be a high capacity office type coloured printer. | | | |
| **1.3.3.** | The printer shall be able to connect office networks through following interfaces:<br>• USB 2.0 or higher<br>• 10Base-T/100Base-TX/1000Base-T<br>• WLAN (IEEE802.11b/g/n or newer)<br>• Wi-Fi Direct | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.3.4.** | The printer shall have a coloured touch screen control panel, minimum 7 inches in size. | | | |
| **1.3.5.** | The printer shall be able to handle paper sizes in the range of min A6 to maximum A3. | | | |
| **1.3.6.** | The printing speed shall be as follows;<br>Printer shall have the ability to print/copy documents in following minimum speeds according to the paper size:<br>• A4 paper size: 25 ppm (black and white) and 25 ppm (in colour)<br>• A3 paper size: 10 ppm (black and white 10) and 12 ppm (in colour). | | | |
| **1.3.7.** | The printer shall be compatible with Windows 11 and Windows Server 2022 operating systems. | | | |
| **1.3.8.** | The printer shall be able to print scan and copy in 600x600 dpi or better. | | | |
| **1.3.9.** | The printer shall have an internal storage of 128 GB in minimum and internal memory of minimum 2 GB RAM. | | | |
| **1.3.10.** | The printer shall have the minimum paper capacity of;<br>• Bypass: 1 x 100 sheets,<br>• Inner Output Tray: 550 sheets. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.3.11.** | The printer shall have a large capacity paper feeder, minimum 1000 sheets in A4 paper format. | | | |
| **1.3.12.** | Direct printing/scanning with USB Drives shall be possible. | | | |
| **1.4.** | **Graphic Processing Unit (GPU)** | | | |
| | **Quantity: 5** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **1.4.1.** | The GPU shall be capable of using ray tracing technology. | | | |
| **1.4.2.** | The GPU architecture shall have 3 fans for ideal cooling. | | | |
| **1.4.3.** | The GPU shall have minimum 16 GB GDDRX VRAM. | | | |
| **1.4.4.** | The GPU memory interface width shall be 256 bit. | | | |
| **1.4.5.** | The GPU shall be a desktop GPU. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.4.6.** | The GPU shall possess minimum 9728 cuda cores. | | | |
| **1.4.7.** | The GPU shall use PCI Express 4 interface technology or newer. | | | |
| **1.4.8.** | The GPU shall have base clock speed of 2.2 GHz as minimum. | | | |
| **1.4.9.** | The GPU shall have a turbo boost speed of 2.51 GHz as minimum. | | | |
| **1.4.10.** | The GPU shall support at least 3 x Display Ports(1.4a) and 1 x HDMI(2.1) port. | | | |
| **1.5.** | **Database Server** | | | |
| | **Quantity: 2** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **1.5.1.** | The database server shall have minimum 2 processors with the following specifications;<br>• At least 12 cores and at least 20 threads,<br>• A clock speed of 2.10 GHz or higher,<br>• A turbo speed of 3.30 GHz or higher. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.5.2.** | The server shall have at least 4 RAM slots. In total minimum 256GB of 2933 MHz (or higher frequency) DDR4 ECC RAM shall be installed. | | | |
| **1.5.3.** | The database server shall have the following storage devices;<br>• M.2 PCIe NVMe type SSD of minimum 500 GB,<br>• 12x 10000 RPM HDD drive of minimum 1.2TB. | | | |
| **1.5.4.** | The server shall have the following ports as minimum;<br>• 4x USB 3.1 (or newer) Type A,<br>• 1x HDMI,<br>• 1x RJ 45,<br>• 4x 1 GbE Ethernet Port. | | | |
| **1.5.5.** | The data server shall have 2 Power supplies with minimum power of 750W each. | | | |
| **1.5.6.** | Each server shall be delivered with at least one monitor with the specifications of;<br>• At least 23.5" of screen size,<br>• Full HD,<br>• HDMI and DisplayPort (1.2 or newer) type inputs | | | |
| **1.6.** | **Data Storage Unit** | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| | **Quantity: 2** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **1.6.1.** | Data storage unit shall be tower-type with 8 drive bays. | | | |
| **1.6.2.** | Data storage unit shall have 8-core 64 bit CPU or better. | | | |
| **1.6.3.** | Data storage unit shall have minimum 8 GB of DDR4 RAM. The memory of the data storage unit shall be expandable up to minimum 32GB. | | | |
| **1.6.4.** | Data storage unit shall be compatible with 3.5" and 2.5" SATA drives. | | | |
| **1.6.5.** | Data storage unit shall support maximum storage capacity of minimum 144 TB. | | | |
| **1.6.6.** | Data storage unit shall have the following ports as minimum;<br>• 2 x RJ-45,<br>• 2x USB 3.2,<br>• 1 x 10 Gigabit Ethernet. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.6.7.** | Data storage unit shall have WOL ( wake on LAN) function. | | | |
| **1.6.8.** | Data storage unit shall have a firewall for protection against harmful software. | | | |
| **1.6.9.** | Data storage unit shall be compatible both with Windows and macOS operating systems. | | | |
| **1.6.10.** | Data storage unit shall be accessible from PC, Laptop and a smartphone. | | | |
| **1.6.11.** | Data storage unit shall support Turkish Language. | | | |
| **1.6.12.** | The data storage unit shall be supplied with 8 identical hard disk drives (HDD) installed on it, each of which having the following specifications as minimum;<br>• Storage capacity shall be 10 TB,<br>• 7200 RPM,<br>• 256 MB cache. | | | |
| **1.7.** | **Uninterruptible Power Supply (UPS)** | | | |
| | **Quantity: 2** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| | **Country of origin** | | | |
| **1.7.1.** | The nominal power of the UPS shall be minimum 20 KVA. | | | |
| **1.7.2.** | The output voltage shall be at least 220/230/240VAC. | | | |
| **1.7.3.** | Output frequency shall be 50 ± 0.5 Hz. | | | |
| **1.7.4.** | The UPS shall have online working principle. | | | |
| **1.7.5.** | The UPS shall have sine wave technology. | | | |
| **1.7.6.** | The UPS shall have automatic voltage regulation. | | | |
| **1.7.7.** | The UPS shall have an LCD display panel to show information on battery and power conditions. | | | |
| **1.7.8.** | Maximum UPS voltage distortion shall be ±1%. | | | |
| **1.7.9.** | The UPS shall have a management software providing means for controlling and monitoring the UPS. | | | |
| **1.7.10.** | The UPS shall have audible alarms for;<br>• Low battery<br>• Overload<br>• System fault | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **1.7.11.** | The UPS shall have protection system(s) for;<br>• Overloading<br>• Short circuit<br>• Overcharging of the battery | | | |
| **1.7.12.** | The maximum efficiency of UPS shall be minimum 90%. | | | |
| **1.7.13.** | The UPS shall operate under the conditions of;<br>• Operating humidity shall be at least between 20% - 90% under non-condensing conditions,<br>• Temperature range of 0-40°C. | | | |
| **1.7.14.** | UPS shall provide power with 90% capacity at least for 4 hours in case of electricity shortage. | | | |
| **1.7.15.** | The UPS shall have the following ports as minimum;<br>• 1x RS232<br>• 1x USB | | | |
| **1.7.16.** | The UPS shall comply SNMP Protocol. | | | |
| **1.8.** | **Air Conditioner** | | | |
| | **Quantity: 2** | | | |
| | **Manufacturer's name** | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **1.8.1.** | The air conditioner shall be remote controlled split type and wall installed. | | | |
| **1.8.2.** | The compressor of the air conditioner shall be Inverter type. | | | |
| **1.8.3.** | Cooling capacity shall be 24,000 BTU. | | | |
| **1.8.4.** | Heating Capacity shall be 24,000 BTU. | | | |
| **1.8.5.** | Minimum energy efficiency shall be A++ for cooling and A+ for heating. | | | |
| **1.8.6.** | The cooling gas shall be R32. | | | |
| **1.8.7.** | The air conditioner shall have the following functions as minimum;<br>• Swing adjustment<br>• Fan speed control (at least 4 fan levels)<br>• Sleep mode | | | |
| **1.8.8.** | The maximum noise level of the air conditioner shall be 65 dB(A) for indoor unit and 70 dB(A) for outdoor unit. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **1.8.9.** | The air conditioner shall have auto cleaning feature. | | | |
| **1.9.** | **Managed Switch** | | | |
| | **Quantity: 2** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **1.9.1.** | The managed switch shall have 48 10/100/1000 Base-T GbE ports. | | | |
| **1.9.2.** | The switching capacity shall be at least 150 Gbps. | | | |
| **1.9.3.** | The managed switch shall have minimum 4x SFP Ports. | | | |
| **1.9.4.** | The managed switch shall support IEEE 802.1X | | | |
| **1.9.5.** | The managed switch shall be supplied with all the necessary hardware, equipment, accessories, cables and software for full functionality. | | | |

**LOT - 2: INFORMATION SYSTEMS**

This LOT include items to be used for information collection and sharing on the buses / bus stops. In addition to technical specifications for individual items, all the components under this Lot shall be ensured to have full compatibility with each other for seamless operation and full functionality of the Information Systems.

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.** | **Passenger Information System** | | | |
| | **Quantity: 1** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **2.1.1.** | The Passenger Information System shall consist of three components;<br>• 268 x Bus Information Systems,<br>• 85 x Bus-stop Information Systems,<br>• Information System Software . | | | |
| **2.1.2.** | All the above components shall be compatible with each other to provide an integrated and full functioning system. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.3.** | To set up the Passenger Information System both devices included in In-Bus and Bus-Stop information systems will be installed on the buses and bus stops. | | | |
| **2.1.4.** | All needed cables, accessories and necessary workmanship including cabling for buses and bus-stops shall be supplied as an indispensable part of the installation. | | | |
| **2.1.5.** | **Bus Information System** | | | |
| **2.1.5.1.** | Bus Information System shall be used to inform passengers about the route and stops, as well as for displaying public announcements and information to be disseminated for passengers. | | | |
| **2.1.5.2.** | Bus Information System shall consist of the following components, fully compatible with each other;<br>• Display Panel,<br>• Display Panel Cabin,<br>• Processing Unit. | | | |
| **2.1.5.3.** | Bus Information System shall be delivered with all needed accessories/parts/cabling required for full functionality, installation and mounting for 268 buses. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.5.4.** | Both components and units shall be compatible with the prevailing conditions in the moving vehicles. | | | |
| **2.1.5.5.** | Bus Information System shall have necessary hardware and software features to communicate with the Information System Software. | | | |
| **2.1.5.6.** | The system shall have automatic restart feature for power failures. | | | |
| **2.1.5.7.** | The system shall use Turkish fonts for displaying information. | | | |
| **2.1.5.8.** | **Display Panel** | | | |
| **2.1.5.8.1.** | The display panel shall be a colour LED or colour LCD screen. | | | |
| **2.1.5.8.2.** | The screen size shall be minimum 21.5 inches. | | | |
| **2.1.5.8.3.** | Minimum resolution of the screen shall be 1920x1080 pixels. | | | |
| **2.1.5.8.4.** | Shall support 16.7 million colour standard. | | | |
| **2.1.5.8.5.** | The screen contrast shall be at least 1,000:1. | | | |
| **2.1.5.8.6.** | Input power range shall be between 9-36 V DC. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.5.8.7.** | Aspect ratio of the screen shall be 16:9 | | | |
| **2.1.5.8.8.** | Light intensity shall be at least 300 cd/ $m^2$. | | | |
| **2.1.5.8.9.** | The estimated backlight lifetime shall be minimum 30,000 hours. | | | |
| **2.1.5.8.10.** | The viewing angle of the panel shall be adjustable minimum for;<br>• Horizontal-170 degree,<br>• Vertical-160 degree. | | | |
| **2.1.5.8.11.** | Shall have EC R10 compatibility or equivalent. | | | |
| **2.1.5.9.** | **Display Panel Cabin** | | | |
| **2.1.5.9.1.** | The cabin shall have a non-corrosive metallic case with electrostatic coating. | | | |
| **2.1.5.9.2.** | The cabin shall have min 4mm tempered glass screen surface protection or equivalent. | | | |
| **2.1.5.9.3.** | The cabin shall have a functional audio system with speakers of min 4W power. | | | |
| **2.1.5.9.4.** | The panel shall be suitable for Display Screen installation and maintenance. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.5.9.5.** | The cabin size shall be compatible with the Display Screen and exact dimensions shall be indicated in the tender. | | | |
| **2.1.5.10.** | **Processing Unit** | | | |
| **2.1.5.10.1.** | The Processing Unit shall have an embedded Android operating system. | | | |
| **2.1.5.10.2.** | The processing unit shall have a minimum 1 GHz dual core processor. | | | |
| **2.1.5.10.3.** | The processing unit shall have minimum 4GB DDR3 memory. | | | |
| **2.1.5.10.4.** | The processing unit shall have a memory stick with minimum 512MB capacity. | | | |
| **2.1.5.10.5.** | The processing unit shall have cooling feature. | | | |
| **2.1.5.10.6.** | Shall have the following ports as minimum;<br>• 1x HDMI port,<br>• 1x Ethernet port,<br>• 1x USB. | | | |
| **2.1.6.** | **Bus Stop Information System** | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.6.1.** | Bus Stop Information System shall consist of the following components, fully compatible with each other;<br>• Information Board,<br>• Information Board Cabin,<br>• Processing Unit. | | | |
| **2.1.6.2.** | The components of Bus Stop Information System shall be specifically designed for outdoor use and durable to all possible atmospheric conditions. | | | |
| **2.1.6.3.** | The system shall comply IP65 standard as minimum. | | | |
| **2.1.6.4.** | The power shall be 220 V, 50 HZ. | | | |
| **2.1.6.5.** | Bus Stop Information System shall be delivered with all needed accessories/parts/cabling required for full functionality, installation and mounting. | | | |
| **2.1.6.6.** | Bus Stop Information System shall have necessary hardware and software features to communicate with the Information System Software. | | | |
| **2.1.6.7.** | The system shall have automatic restart feature for power failures. | | | |
| **2.1.6.8.** | The system shall use Turkish fonts for displaying information. | | | |
| **2.1.6.9.** | **Information Board** | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.6.9.1.** | The information board shall be a colour LED or colour LCD screen. | | | |
| **2.1.6.9.2.** | The screen size shall be minimum 40 inches. | | | |
| **2.1.6.9.3.** | Minimum resolution of the screen shall be 1920x1080 pixels. | | | |
| **2.1.6.9.4.** | The information board shall support 16.7 million colour standards. | | | |
| **2.1.6.9.5.** | The screen contrast shall be at least 3,000:1. | | | |
| **2.1.6.9.6.** | Aspect ratio of the screen shall be 16:9. | | | |
| **2.1.6.9.7.** | The information board shall have a built-in brightness sensor to adjust brightness, depending on the ambient light intensity. | | | |
| **2.1.6.9.8.** | Light intensity shall be at least 1,500 cd/ $m^2$. | | | |
| **2.1.6.9.9.** | The estimated backlight lifetime shall be minimum 30,000 hours. | | | |
| **2.1.6.9.10.** | The viewing angle shall be adjustable minimum for;<br>• Horizontal-170 degree,<br>• Vertical-160 degree. | | | |
| **2.1.6.9.11.** | The information board shall have EC R10 compatibility or equivalent. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.6.10.** | **Information Board Cabin** | | | |
| **2.1.6.10.1.** | The cabin shall have a non-corrosive metallic case with electrostatic coating. | | | |
| **2.1.6.10.2.** | The cabin shall have min 4mm tempered glass screen surface protection or equivalent. | | | |
| **2.1.6.10.3.** | The cabin shall have a functional audio system with speakers of min 4W power. | | | |
| **2.1.6.10.4.** | The panel shall be suitable for Information Board installation and maintenance. | | | |
| **2.1.6.10.5.** | The cabin size shall be compatible with the Information Board screen and exact dimensions shall be indicated in the tender. | | | |
| **2.1.6.11.** | **Processing Unit** | | | |
| **2.1.6.11.1.** | The processing unit shall have an embedded Android operating system. | | | |
| **2.1.6.11.2.** | The processing unit shall have a minimum 1 GHz dual core processor. | | | |
| **2.1.6.11.3.** | The processing unit shall have minimum 4GB DDR3 memory. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **2.1.6.11.4.** | The processing unit shall have a memory stick with minimum 512MB capacity. | | | |
| **2.1.6.11.5.** | The processing unit shall have an on-board G/4G GSM/GPRS Modem for data transfer. | | | |
| **2.1.6.11.6.** | The processing unit shall have cooling feature. | | | |
| **2.1.6.11.7.** | The processing unit shall have the following ports as minimum;<br>• 1x Display port (HDMI),<br>• 1x Ethernet port,<br>• 1x USB. | | | |
| **2.1.6.11.8.** | The processing unit shall have the following network connection ports as minimum;<br>• 1x Wi-Fi,<br>• 1x 4G. | | | |
| **2.1.7.** | **Information System Software** | | | |
| **2.1.7.1.** | Information System Software shall be installed on the servers of DMM Transportation Management Centre for monitoring and management of the Passenger Information System and shall also have Bus Module and Bus Stop Module. | | | |
| **2.1.7.2.** | Information system software shall be licenced to DMM Transportation Management Centre, minimum for one year. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.7.3.** | Information System Software shall have advanced security protocols, including but not limited with User Access Security. | | | |
| **2.1.7.4.** | Information System Software shall enable definition of multi user profiles (operators) with different log in identification and authorities. | | | |
| **2.1.7.5.** | Information System Software shall be web-based. | | | |
| **2.1.7.6.** | Information System Software shall be compatible with all common web browsers as well as browsers for mobile devices. | | | |
| **2.1.7.7.** | The communication between central structure and the end points (Buses and bus stops) shall be based on latest version of TCP/IP. | | | |
| **2.1.7.8.** | Information System Software shall have the following features as minimum;<br>• A relational database shall be used for storing and organising data,<br>• PIS server modules<br>• Shall have extensive reporting capacity,<br>• Data sharing,<br>• Shall have a system log. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.7.9.** | Information System Software shall be used to create, disseminate, and store special content for passengers about the transport system, such as arrival times, messages, time, logo, etc. | | | |
| **2.1.7.10.** | The content to be shared on the Information System shall be defined and programmable for;<br>• individual end points,<br>• group of end points,<br>• different time and date settings,<br>• different status of end points. | | | |
| **2.1.7.11.** | Information System Software shall enable connecting and intervention for any specific end point while rest of the system is running as programmed. | | | |
| **2.1.7.12.** | Information System Software shall enable monitoring information content for every end point. | | | |
| **2.1.7.13.** | The status of every end point (such as active /in error / lost connection, etc.) shall be classified and monitored centrally, by employing user friendly interfaces and coloured designs. | | | |
| **2.1.7.14.** | The user interface, menus, windows and all user related content of the Information System Software shall be in Turkish. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.7.15.** | The parameters to be used for communication purposes shall be determined in compliance with DMM Transportation Management Centre parameters. | | | |
| **2.1.7.16.** | Bus module shall be installed on the Processing Unit on the bus and updates shall be possible by connecting USB or MicroSD. | | | |
| **2.1.7.17.** | Bus module shall enable Bus Information System to perform the following features as minimum;<br>• Showing live bus arrivals, bus lines, (previous/current/next),<br>• Next stop announcement by voice,<br>• Remote connection and communication with Information Management Software to display messages. | | | |
| **2.1.7.18.** | Bus Stop module shall be installed on the Processing Unit at the bus stop and updates shall be possible by remote connection. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.1.7.19.** | Bus Stop module shall enable Bus Stop Information System to perform the following features as minimum;<br>• Informing passengers for live bus arrivals, with details of line numbers, remained bus stops/ travel time,<br>• Remained bus stops/ travel time announcement by voice, for the buses arrived,<br>• Remote connection and communication with Information Management Software to display messages. | | | |
| **2.2.** | **Mobile Camera System** | | | |
| | **Quantity: 1** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **2.2.1.** | The Mobile Camera System shall consist of two components;<br>• 150 x Network Video Recorder (NVR),<br>• 1050 x IP Camera. | | | |
| **2.2.2.** | Both components shall be compatible with each other to ensure integrated operation. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.2.3.** | **Network Video Recorder (NVR)** | | | |
| **2.2.3.1.** | The NVR shall be specifically designed for transport vehicles and shall have full compatibility with the existing flee of DMM. | | | |
| **2.2.3.2.** | The NVR shall have at least 8 channels, each of which supports minimum 2MP PoE (or PON) IP camera input. | | | |
| **2.2.3.3.** | Input power range shall cover 9-36 V DC. | | | |
| **2.2.3.4.** | The NVR shall have an on board processor. | | | |
| **2.2.3.5.** | The NVR shall have Linux Operating System, embedded on the device. | | | |
| **2.2.3.6.** | The NVR shall have the plug and play feature. | | | |
| **2.2.3.7.** | The device shall have the following ports as minimum;<br>• 1x RS232 and/or 1x RS485,<br>• 1x VGA and/or 1x HDMI,<br>• 1x USB, 2.0 or higher,<br>• 1x SIM,<br>• 1x CAN and/or IoT. | | | |
| **2.2.3.8.** | The NVR shall support H.264 and/or H.265. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **2.2.3.9.** | The NVR shall support the following applications;<br>• Video compression,<br>• Audio recording,<br>• Recording,<br>• Live monitoring,<br>• Record playback. | | | |
| **2.2.3.10.** | The NVR shall allow minimum 5 simultaneous users for remote monitoring. | | | |
| **2.2.3.11.** | The device shall have the following network connection ports;<br>• 1x RJ45,<br>• Wi-Fi,<br>• 4G or higher. | | | |
| **2.2.3.12.** | The NVR shall have built in GPS support. | | | |
| **2.2.3.13.** | Recorder data storage capacity shall include at least;<br>• 1x SSD or HDD, with minimum 2TB capacity. | | | |
| **2.2.3.14.** | The system shall have automatic restart feature for power failures. | | | |
| **2.2.3.15.** | The operational parameters, such as on/off schedules, recording, etc., shall be adjustable. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.2.4.** | **IP Camera** | | | |
| **2.2.4.1.** | The IP camera shall be infrared, dome type, having minimum resolution of 2MP. | | | |
| **2.2.4.2.** | The IP camera shall have the resolution of 1920x1080. | | | |
| **2.2.4.3.** | The IP camera shall have RJ45 (PoE) or PON connection port or 6 PIN as minimum. | | | |
| **2.2.4.4.** | IP camera frame rate shall be 30 fps or better. | | | |
| **2.2.4.5.** | The device shall comply the minimum IP-66 standard. | | | |
| **2.2.4.6.** | The IP camera shall operate under the conditions of;<br>• Operating humidity range shall be at least between 10% - 80% under non-condensing conditions,<br>• Temperature range of -20 to +55°C. | | | |
| **2.2.4.7.** | The IP camera shall have the moving object detection feature for improved video surveillance. | | | |
| **2.2.4.8.** | The IP camera shall support H.264 and/or H.265 standards. | | | |
| **2.2.4.9.** | The IP camera shall have a built in microphone. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.3.** | **Monitoring Screen Set** | | | |
| | **Quantity: 1** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **2.3.1.** | Monitoring screen set shall consist of;<br>• 2x Large Wall Screen,<br>• 4x Small Wall Screen . | | | |
| **2.3.2.** | Monitoring Screens shall be installed in the DMM Transportation Management Centre, including all accessories, supplies and cabling needed for installation and mounting. | | | |
| **2.3.3.** | Monitoring screens will be connected to the DMM Transportation Management Centre network to monitor systems used, such as Passenger Information System, mobile cameras, Passenger Counting System, Transport Modelling and Simulation. | | | |
| **2.3.4.** | **Large Wall Screen** | | | |
| **2.3.4.1.** | The screen size shall be minimum 75 inches (190cm). | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.3.4.2.** | The minimum resolution shall be 4K UHD (3840x2160 pixels). | | | |
| **2.3.4.3.** | The image refresh rate shall be 50Hz or higher. | | | |
| **2.3.4.4.** | The screen shall have the necessary structure and accessories for wall mount. | | | |
| **2.3.4.5.** | The screen shall have Wi-Fi and Bluetooth (5.0 or higher) connectivity. | | | |
| **2.3.4.6.** | The screen shall have the following ports as minimum;<br>• 2 x HDMI(2.1),<br>• 2 x USB,<br>• 1 x RJ 45. | | | |
| **2.3.4.7.** | The screen shall have optical audio output. | | | |
| **2.3.5.** | **Small Wall Screen** | | | |
| **2.3.5.1.** | The screen size shall be minimum 55 inches (139cm). | | | |
| **2.3.5.2.** | The minimum resolution shall be 4K UHD (3840x2160 pixels). | | | |
| **2.3.5.3.** | The image refresh rate shall be 50Hz or higher. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
|---|---|---|---|---|
| **2.3.5.4.** | The screen shall have the necessary structure and accessories for wall mount. | | | |
| **2.3.5.5.** | The screen shall have Wi-Fi and Bluetooth (5.0 or higher) connectivity. | | | |
| **2.3.5.6.** | The screen shall have the following ports as minimum;<br>• 2 x HDMI(2.1),<br>• 2 x USB,<br>• 1 x RJ 45. | | | |
| **2.3.5.7.** | The screen shall have optical audio output. | | | |
| **2.4.** | **Passenger Counting System** | | | |
| | **Quantity: 1** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **2.4.1.** | Passenger Counting System shall consist of two components;<br>• 820 x Readers,<br>• Counting System Software. | | | |
| **2.4.2.** | Both components shall be fully compatible with each other, ensuring an integrated operation. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.4.3.** | **Readers** | | | |
| **2.4.3.1.** | Readers shall comply with UWB and/or BLE protocols. | | | |
| **2.4.3.2.** | Readers shall be capable of detecting signals, location and ID information that are generated by UWB and/or BLE-based devices of passengers. | | | |
| **2.4.3.3.** | Readers shall be installed as follows, including all accessories, supplies and cabling needed for installation and mounting;<br>• 735 Readers shall be installed in 258 buses,<br>• 85 Readers shall be installed in 85 bus stops. | | | |
| **2.4.3.4.** | The communication technology used shall be one of the following;<br>• RS485,<br>• Wi-fi,<br>• Bluetooth. | | | |
| **2.4.3.5.** | Power shall be in the range of 9-36 V DC. | | | |
| **2.4.3.6.** | Shall be compatible with the atmospheric conditions in the public transport buses and bus stops, including durability against water and dust. | | | |
| **2.4.3.7.** | Readers shall smoothly operate in the temperature range of -40 to 60°C as minimum. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.4.4.** | **Counting System Software** | | | |
| **2.4.4.1.** | Counting System Software shall be installed on the servers of DMM Transportation Management Centre for monitoring and reporting the mobility of passengers in the city transport, and shall also include software to be used on Readers. | | | |
| **2.4.4.2.** | Counting System Software shall be licenced to DMM Transportation Management Centre, minimum for one year. | | | |
| **2.4.4.3.** | Counting System Software shall have advanced security protocols, including but not limited with User Access Security. | | | |
| **2.4.4.4.** | Counting System Software shall enable definition of multi user profiles (operators) with different login identification and authorities. | | | |
| **2.4.4.5.** | Counting System Software shall be web-based. | | | |
| **2.4.4.6.** | The software shall be compatible with all common web browsers as well as browsers for mobile devices. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.4.4.7.** | Counting System Software shall have the following features as minimum;<br>• A relational database shall be used for storing and organising data,<br>• Data sharing,<br>• Shall have extensive reporting capacity,<br>• Shall have user friendly interface. | | | |
| **2.4.4.8.** | Counting System Software shall enable central setting of date and time and there shall be synchronization for both components of Counting System. | | | |
| **2.4.4.9.** | Counting System Software shall enable remote activating/deactivating/resetting any specific Reader. | | | |
| **2.4.4.10.** | Counting System Software shall enable remote monitoring of Reader activities and provide means of intervention in case of need/error. | | | |
| **2.4.4.11.** | The Counting System Software shall enable grouping Readers for management and operation. | | | |
| **2.4.4.12.** | The status of Readers shall be monitored on the Counting System Software. | | | |
| **2.4.4.13.** | The status of every Reader (such as active /in error / lost connection, etc.) shall be classified and monitored centrally, by employing user friendly interfaces and coloured designs. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.4.4.14.** | The user interface, menus, windows and all user related content of the Counting System Software shall be in Turkish. | | | |
| **2.4.4.15.** | The readers shall also have an embedded software, which will enable data collection and transfer of the data to the central system. Software updates shall be possible by remote connection. | | | |
| **2.4.4.16.** | The parameters to be used for communication purposes shall be determined in compliance with DMM Transportation Management Centre parameters. | | | |
| **2.5.** | **Wi-Fi Router** | | | |
| | **Quantity: 258** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **2.5.1.** | The router shall operate smoothly in moving vehicles and shall ensure trouble-free operation under the prevailing conditions of transport. | | | |
| **2.5.2.** | The router shall have dual sim feature. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks, ref to documentation | 5.<br>Evaluation committee's notes |
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| **2.5.3.** | Network access capabilities shall be compatible with the following as minimum;<br>• 4G cellular access or higher,<br>• LTE CAT4 standard,<br>• WiFi IEEE 802.11/b/g/n,<br>• 1x RS232 and/or 1x RS485 | | | |
| **2.5.4.** | The router shall have at least 4 ports, supporting the following as minimum;<br>• 10/100Mbps fast Ethernet,<br>• WAN/LAN/WLAN. | | | |
| **2.5.5.** | Input power range shall be between 5-36 V DC. | | | |
| **2.5.6.** | The router shall have 2.4G Wi-Fi capability as minimum. | | | |
| **2.5.7.** | The working temperature range of router shall be between -35°C - +75°C as minimum. | | | |

**LOT - 3: TRAFFIC MODELLING AND SIMULATION**

This LOT includes items to be used for traffic modelling and simulation purposes.

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks,<br>ref to documentation | 5.<br>Evaluation committee's notes |
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| **3.1.** | **Traffic Modelling and Simulation Software** | | | |
| | **Quantity: 2** | | | |
| | **Manufacturer's name** | | | |
| | **Product model/type** | | | |
| | **Country of origin** | | | |
| **3.1.1.** | The software may be a single specific software or may consist of more than one different software bundled together to address all the specifications given below. | | | |
| **3.1.2.** | The software shall address two main functionalities;<br>• Traffic Modelling,<br>• Traffic Simulation. | | | |
| **3.1.3.** | The performance of the software, no matter which components/modules are included, shall fulfil all the specifications given below sections. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks,<br>ref to documentation | 5.<br>Evaluation committee's notes |
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| **3.1.4.** | Components-modules of the software shall integrate with each other and seamlessly perform together for the features including but not limited with;<br>• Data usage and sharing,<br>• Export / Import functions. | | | |
| **3.1.5.** | The software shall be used on a network system, up to 20 users. | | | |
| **3.1.6.** | The software shall fully perform on 64-bit computers that run Windows 10 or Windows 11 Operating System. | | | |
| **3.1.7.** | The software shall be compliant with Windows standards of .NET, COM, ADO, and shall exchange data with Office apps. | | | |
| **3.1.8.** | The software shall have user friendly interface, making use of coloured designs and easy to navigate windows. | | | |
| **3.1.9.** | **Traffic Modelling** | | | |

| 1.<br><br>Item number | 2.<br><br>Specifications required | 3.<br><br>Specifications offered | 4.<br><br>Notes, remarks,<br><br>ref to documentation | 5.<br><br>Evaluation committee's notes |
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| **3.1.9.1.** | The software shall perform the functions needed for traffic modelling, including the following as minimum but not limited with them;<br>• Demand modelling<br>• Public transport planning<br>• Private transport planning<br>• Heavy vehicles transport planning<br>• Road development<br>• Environmental impact analysis<br>• Economic analysis of transport operational costs and revenues.<br>• Modelling and analysis on the traffic flow, nodes, junctions.<br>• Passenger surveys. | | | |
| **3.1.9.2.** | The software system shall enable running traffic related scenarios | | | |
| **3.1.9.3.** | The software system shall have built in reporting tools allowing organizing results/reports in a user defined way. | | | |
| **3.1.9.4.** | The software system shall enable performing scenario analysis and comparison of data from tables, charts, graphs, etc. | | | |
| **3.1.9.5.** | The software shall have GIS integration and exchange GIS data with other GIS software such as Esri. | | | |
| **3.1.9.6.** | The software shall have MS SQL interface. | | | |

| 1.<br>Item number | 2.<br>Specifications required | 3.<br>Specifications offered | 4.<br>Notes, remarks,<br>ref to documentation | 5.<br>Evaluation committee's notes |
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| **3.1.10.** | **Traffic Simulation** | | | |
| **3.1.10.1.** | The software shall be capable of modelling the complex traffic systems in both 2-dimensional and 3-dimensional geographic information system (GIS) environment. | | | |
| **3.1.10.2.** | The 3D visualization shall produce high quality graphics that can be used for visual aids and public presentations. | | | |
| **3.1.10.3.** | Recording the simulation to video form shall be possible. | | | |
| **3.1.10.4.** | The software shall be used for varying sizes of simulation, to simulate and evaluate traffic either for a defined point such as junction, road, etc. or for a region/city. | | | |
| **3.1.10.5.** | The software shall enable simulation of traffic, cyclists, pedestrians and public transport simultaneously. | | | |
| **3.1.10.6.** | The software shall be capable of simulating Intelligent Transport System (ITS) and autonomous vehicles. | | | |
| **3.1.10.7.** | Simulation shall be possible for different traffic conditions, interrupted/uninterrupted flow, rural and urban settings. | | | |

| 1.<br><br>Item number | 2.<br><br>Specifications required | 3.<br><br>Specifications offered | 4.<br><br>Notes, remarks,<br><br>ref to documentation | 5.<br><br>Evaluation committee's notes |
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| **3.1.10.8.** | The software shall be used to create simulations to support the following studies as minimum;<br><br>• Traffic impact analysis,<br>• Transportation planning,<br>• Traffic signal optimization,<br>• Traffic engineering. | | | |