UNIVERSITY of GUELPH

PHYSICAL RESOURCES

TENDER

General Contracting Services
for

Building #046 Renovations
For
College of Social and Applied Human Sciences

Project No. 504034

ADDENDUM 3

December 05, 2018

Part 1 - GENERAL

A3.1 The following is provided to bidders as additional information and/or clarification and/or in response to questions.

A3.2 ***This Addendum shall form an integral part of the Contract Documents and amends the original Specifications and Drawings and shall be read in conjunction with the Tender as issued by the University of Guelph on November 15, 2018, dated November 2, 2018. This Addendum shall take precedence over all requirements to the aforementioned Tender with which it may prove to be at variance.***

A3.3 Receipt of this Addendum shall be acknowledged on form Appendix C as a part of your submission. Failure to do so may subject the Proponent to disqualification.

A3.4 Ensure that all affected parties are aware of the items noted and include any and all cost impacts in the Tender submission.

A3.5 This Addendum contains:

.1 Part 1 – GENERAL

.2 Part 2 – CLARIFICAITONS

- Questions/Answers
- Specifications
- Drawings

Part 2 - CLARIFICATIONS

QUESTIONS / ANSWERS

A3.6 **Q1:** Section 028212 Asbestos Abatement – Type 3 Procedures item 1.3.7.5, the portion of work in Sewage Room 120A should be included in Separate Price #1, please clarify the portion of the 6,000 sf to be allocated to the Separate Price.

A1: Abatement required to remove tanks from Sewage Room 102A is to be included as part of Separate Price 1. Contractor to include all other associated abatement with sewage room 102A in the base bid.

A3.7 **Q2:** Can asbestos abatement be performed per wing or would multiple small abatement sections be required?

A2: Wings B and C will be unoccupied during the course of construction. Contractor to perform abatement as required to meet project timelines.

A3.8 **Q3:** We cannot see any blinds type 3 (one-way mirror locations interior walls). Please advise.

A3: As per Specification Section 12 21 00 (Roller and Acoustic Blinds), Part 3 (Execution), Article 3.7 (Schedule), Contractor to provide Type-3 blinds on both sides of all one-way mirror locations. Locations also shown as ‘Sound Absorbing Blinds’ (SAB) on architectural drawings A53 and A54.

A3.9 **Q4:** What is the extent of exterior items to be painted?

A4: Extent of exterior painting required is as described on architectural drawings and specification 09 91 13 – Exterior painting.

A3.10 **Q5:** Spec is calling for Paint Manufacturer's inspections, but is also asking for MPI Inspections.

A5: MPI Inspections are not required.

A3.11 **Q6:** Paint spec, item 2.5.2 talks about epoxy on masonry units in Wet Environments. Not sure if this job even has any masonry units, but can you confirm if epoxy is required, in which rooms would this be?

A6: There are new and existing concrete block walls within this project. Refer to drawings for locations. Anticipated wet environments requiring epoxy painting include but are not limited to custodial rooms and washrooms.

A3.12 **Q7:** Is floor sealer only required in Room 138?

A7: Floor sealer is required in all locations indicated on architectural drawings A86 as “Sealed Concrete”.

A3.13 **Q8:** Paint spec, item 3.5.2.2.6 talks about spray painting to doors/frames. If this is required, will we be given area to spray paint them (before any hardware etc. is attached)?

A8: Contractor is responsible for delivery, coordination and space allocation of all required work. No additional space will be provided on campus.

A3.14 **Q9:** For rooms that do not show paint finish in ceiling finish column, can you confirm we do not have to paint any exposed ceilings/mech/elec etc.?

A9: Ceilings indicated as ‘exposed structure’ on architectural drawings do not require paint finish of the structure. Painting of piping and equipment is to meet the requirements of all specification sections.

A3.15 **Q10:** The Front End Documentation states that the General Contractor is to carry Telecommunications Cable Work. Please confirm that this is the complete telecommunications system, including equipment, racks, devices, patch panels and cords, backbone, etc**.**

A10: Confirmed. Please refer to Specification Section 27 00 03 (Communications Systems General Requirements).

A3.16 **Q11:** The Front End Documentation states that the General Contractor is to carry Telecommunications Cable Work. Please confirm if the Paging System falls under this scope of work**.**

A11: Confirmed. Please refer to Specification Section 27 00 03 (Communications Systems General Requirements.

A3.17 **Q12:** The Front End Documentation states that the General Contractor is to carry Telecommunications Cable Work. Please confirm if the Cable Tray falls under this scope of work.

A12: Cable tray is to be supplied and installed by the Electrical Contractor.

A3.18 **Q13:** The Front End Documentation states that the General Contractor is to carry Telecommunications Cable Work. Please confirm that the Electrical Contractor is not to carry any Communications Scope.

A13: Electrical Contractor is responsible for all pathways in Communications scope. Refer to IT/Communications drawings for more details

A3.19 **Q14:** The Front End Documentation states that the General Contractor is to carry Access Control/Security work. Please confirm that this is the complete Access Control/Security Work, including head end equipment, devices, cabling, etc**.**

A14: The access control system is new throughout this project and is an addition to the existing campus access control system. Please refer to drawings T100 to T110 and Specification Division 28 for product systems and requirements.

A3.20 **Q15:** The Front End Documentation states that the General Contractor is to carry Access Control/Security work. Please confirm if the Video Intercom/CCTV falls under this scope of work.

A15: Confirmed.

A3.21 **Q16:** The Front End Documentation states that the General Contractor is to carry Access Control/Security work. Please confirm if the Universal Washroom System (Emergency Call) falls under this scope of work.

A16: Confirmed.

A3.22 **Q17:** The Front End Documentation states that the General Contractor is to carry Access Control/Security work. Please confirm if the Duress System falls under this scope of work.

A17: Confirmed.

A3.23 **Q18:** The Front End Documentation states that the General Contractor is to carry Access Control/Security work. Please confirm that the Electrical Contractor is not to carry any Communications Scope.

A18: Electrical Contractor is responsible for all pathways in Communications scope. Refer to T100 drawings for more detail.

A3.24 **Q19:** Please confirm that the Fire Alarm System is under the Electrical Contractor's scope of work, but the Fire Alarm Testing and Verification is to be carried by the General Contractors as indicated in the Front End Documentation.

A19: Fire alarm testing and verification to be included in General Contractor's base bid and not as an allowance. Please refer to testing information provided in Specification Section 26 02 02 (Electrical Commissioning - General), and Section 28 31 00 (Fire Detection and Alarm).

A3.25 **Q20:** Can you please clarify an exact scope, who's running conduit, cable. Are the 3 preferred security vendors only installing, testing and commissioning, i.e. Parts & Smarts. Also, if you can provide device count for Div. 28 Access Control. CCTV, quantities, which type of camera goes where (Riser, etc.).

A20: Access control doors and camera locations have been identified in the drawings. Refer to IT/Communications drawings T102 and T103. Refer to Specification Sections 28 23 29-1, 28 23 29-2, 28 23 29-3 and 28 23 29-4 for all other camera information. Ensure cameras can handle the environmental conditions of the locations as shown in the drawings. Refer also to Division 26 for pathways, Division 27 for cabling and Division 28 for installation, testing and commissioning.

A3.26 **Q21:** Clarification regarding terrazzo floor repairs for 'C' Wing drawing A88. Details 4 & 6/A88 appear to indicate a terrazzo floor repairs & infill at the door thresholds. Are these details supposed to be typical to all transitions between carpet or resilient sheet flooring and existing terrazzo? Why would we require repairs or infills at these locations, the doors and frames remain as is.

A21: While some doors and frames are existing to remain, there are numerous new openings, doors and frames. As illustrated in details on architectural drawing A88, repair and patching of the existing terrazzo will be required at all these locations. Location of transitions between flooring materials are illustrated on architectural drawings A86, A87 and A88.

A3.27 **Q22:** It is observed that the finish schedule and drawings (A86 to A88) contradicts over the floor finishes. E.g. Washroom floors as per schedule – RSF and the drawings shows porcelain tiles.

A22: Architectural finish schedule on drawing A85 and floor finishes plans on drawings A86, A87 and A88 clearly specify flooring in washrooms is to be porcelain/ceramic tile (CFT). Please note the washroom room tags appear as "WRXXX" to differentiate from custodian rooms.

A3.28 **Q24:** What hours would fall under "normal hours" and "quiet hours?"

A24: Refer to specification Section 01 14 03 – Special Project Scheduling Requirements for restrictions on working hours.

A3.29 **Q25:** Does Separate Price No. 1 include for the removal of the bio waste?

A25: Separate Price No. 1 is to include for the potential removal of bio-waste from within the digester tanks.

A3.30 **Q26:** Please confirm that panel BP-1 is a 600V, 3 phase, 3 wire panel.

A26: Confirmed.

A3.31 **Q27:** Please confirm that panel DP-1E is a 347/600V panel.

A27: DP-1E is a 600V, 3 phase, 3 wire delta panel. It cannot presently provide 347V.

A3.32 **Q28:** Section 06 40 00 **-** Subsection 2.1.16.2 makes reference to a selection of 8 colours based on the full range of solid colours. Note melamine can vary substantially in priced based on the criteria noted within a manufacturer's selections (colours, textures and patterns). Please provide a specific products that can be used as the base for preparing a quote for this tender.

A28: As indicated in Specification Section 06 40 00 Article 2.1.16.2, melamine colours are to be later selected by the consultant from the manufacturer's full range of colours. It also notes, these colours will be solid.

A3.33 **Q29:** Is the intent for the casework to be melamine on particle board core or plastic laminate on DFP core?

A29: It is the intent that casework doors and exposed surfaces are plastic laminate and casework interiors are melamine. See revisions to specifications for further clarification.

A3.34 **Q30:** Please confirm millwork MW-125 shown in details 1 and 2 on drawing A93 is to be PL-2.

A30: Confirmed. Finish of MW-125 is to be PL-2.

A3.35 **Q31:** Please provide plastic laminate colour for the guardrail panels detailed on drawing A68.

A31: Finish of plastic laminate stair panels as detailed on drawing A68 to be of PL-1.

A3.36 **Q32:** Please confirm all stair P.Lam panel support angles and handrail brackets are supplied by 05 50 00 as part of the guardrail assembly (details 4, 11, 12/A68).

A32: Contractor is to provide custom handrail support angles and brackets as detailed on architectural drawings.

A3.37 **Q33:** Are benches, planters and bicycle racks indicated on civil drawing C01 to be purchased from the Landscape cash allowance?

A33: No. Benches, planters and bicycle racks are to be included in the bid price.

A3.38 **Q34:** Section 01 21 00, Item 1.2.13.3 shows a cash allowance of $5,000 for Landscaping. Is this intended for the landscaping works shown on drawing C01? Please confirm.

A34: No. All landscape work shown on drawings and in specifications is to be included in the bid price. The landscape allowance included in Section 01 21 00 – Allowances is for small plantings to be later selected**.**

A3.39 **Q35:** Please advise if corner guards are required in Wing C.

A35: Yes. Corner guards are to be provided in both Wing B and Wing C.

A3.40 **Q36:** Please advise if the interior composite wood veneer panels and associated wood returns (i.e. detail 11/A27) will also be supplied by section 07 42 43 [Composite Wall Panels] – refer to item 2.3. Otherwise, please provide specifications for the interior composite wood wall panels.

A36: Yes. Composite wood veneer panels are as specified in Section 07 42 43 – Composite Wall Panels.

A3.41 **Q37:** Composite Wood veneer ceiling Panels (Drawings A53 to A59): Please advise if the interior composite wood veneer ceiling panels (WD) and associated wood returns will also be supplied by section 07 42 43 [Composite Wall Panels] – refer to item 2.3. Otherwise, please provide specifications for the interior composite wood ceiling panels.

A37: Yes. Composite wood veneer panels are as specified in Section 07 42 43 – Composite Wall Panels.

SPECIFICATIONS

A3.42 SECTION 00 21 07 – INVITATION TO BIDDERS

.1 **REVISE**: Article 6.1.1 as follows:

DELETE: **"**waterloo@melloul.com" as the Contact Email for Melloul-Blamey Construction Inc.

ADD: "michelle.voss@melloul.com" as the Contact Email for Melloul-Blamey Construction Inc.

A3.43 SECTION 06 40 00 – ARCHITECTURAL WOODWORK

.1 **DELETE:** Sub-paragraph 2.1.25.1 in entirety.

.2 **ADD:** Sub-paragraph 2.1.25.1 as follows:

"Countertops, nosing and under nosings: plastic laminate on 19 mm industrial grade particleboard, unless otherwise noted."

.3 **DELETE:** Paragraph 2.1.26 in entirety.

.4 **ADD:** Paragraph 2.1.26 as follows:

"Lower Cabinet Units:

.1 Countertops, nosing and under nosing, backsplash and sidesplash: plastic laminate on 19 mm industrial grade particleboard, unless otherwise noted.
.2 Case body, backs, shelving unit inserts, doors and gables: plastic laminate on 19 mm industrial grade particleboard unless otherwise noted.
.3 Interiors: MCP.
.4 Drawers: fronts, sides, back and bottom from 19 mm industrial grade particleboard, unless otherwise noted.
.5 Kickplate: 100 mm x 19 mm / 4'"x ¾" plywood (DFP)."

.5 **DELETE:** Paragraph 2.1.27 in entirety.

.6 **ADD:** Paragraph 2.1.27 as follows:

"Upper Cabinet Units:

.1 Case body, backs, shelving unit inserts, doors and gables: plastic laminate on 19 mm industrial grade particleboard unless otherwise noted.
.2 Interiors: melamine on 19 mm industrial grade particleboard, unless otherwise noted."

.7 **DELETE:** Sub-paragraph 2.1.28.1 in entirety.

.8 **ADD:** Sub-paragraph 2.1.28.1 as follows:

"Fabricate stools from plastic laminate on 19 mm industrial grade plywood, to profiles as indicated."

A3.44 SECTION 06 62 00 – SOLID FABRICATIONS

.1 **REVISE:** References to 19 mm solid polymer material thickness to 12 mm solid polymer material thickness in Paragraph 2.3.4 and Paragraph 2.3.5.

.2 **ADD:** Article 3.6 Schedule to Part 3 as follows:

"3.6 SCHEDULE

.1 SLDS-1: all solid surface locations unless noted otherwise.

.2 SLDS-2: at all washroom solid surface locations."

A3.45 SECTION 08 70 05 – CABINET AND MISCELLANEOUS HARDWARE

.1 **DELETE:** Paragraph 2.2.7 in entirety.

.2 **ADD:** Paragraph 2.2.7 as follows:

"Handrail Mount:
.1 Acceptable product: 'HR20WABS' by C.R. Laurence."

.3 **DELETE:** Paragraph 2.2.8 in entirety.

A3.46 SECTION 10 29 10 – MISCELLANEOUS SPECIALTIES

.1 **DELETE:** Paragraph 2.2.2 in entirety.

.2 **ADD:** Paragraph 2.2.2 as follows:

"Chair rails: provide 4" high chair rail, around perimeter of Waiting 143 and Waiting 236, colour to later select by consultant from manufacturers full range of colours.
.1 Acceptable products:
.1 Chair rail: 'SCR-40N' as manufactured by Construction specialties, or approved alternate."

.

A3.47 SECTION 28 23 29.4 – MULTI-SENSOR PANAROMIC 4X1080P CAMERA

.1 **DELETE**: Section in its entirety.

ADD: The attached section.

DRAWINGS

A3.48 DRAWING A14 – ARCHITECTURAL ALTERED FLOOR PLAN WING B LEVEL 2

.1 **ADD:** Millwork tag MW-219 along the north wall of Storage 219. Refer to detail 3 on drawing A94 for size and location.

.2 **ADD:** Millwork tag MW-219A along the east wall of Storage 219. Refer to detail 3 on drawing A94 for size and location.

.3 **ADD:** Millwork tag MW-212 along the west wall of Test Library 212. Refer to detail 10 on drawing A94 for size and location.

.4 **ADD:** Millwork tag MW-212A along the east wall of Test Library 212. Refer to detail 10 on drawing A94 for size and location.

.5 **REVISE:** Millwork tag to MW-212 along the west wall of Test Library 212 in detail 10 on drawing A94.

.6 **REVISE:** Millwork tag to MW-212A along the east wall of Test Library 212 in detail 10 on drawing A94.

.7 **REVISE:** The following detail tag titles:

.1 Detail 6 on drawing A94: to read “Millwork Plan MW-119” in lieu of “Millwork Plan MW-124”.

.2 Detail 10 on drawing A94: to read “Millwork Plan MW-212 and MW-212A” in lieu of “Millwork Plan MW-214 and MW-214A”.

.3 Detail 11 on drawing A94: to read “Millwork Elevation MW-212” in lieu of “Millwork Elevation MW-214”.

.4 Detail 11 on drawing A94: to read “Millwork Elevation MW-212A” in lieu of “Millwork Elevation MW-214A”.

A3.49 DRAWING A80 – ARCHITECTURAL DOOR AND FRAME SCHEDULE, DOOR AND FRAME TYPES

.1 **REVISE:** STC rating of D224 from 50 to 35.

A3.50 DRAWING M67 – VENTILATION SCHEDULES 1 OF 2

.1 **REVISE**: Louvre Schedule – “Size” column as follows:

DELETE: The word “width” and replace with “height”.

.2 **ADD**: The following in the “Comments” column of the Louvre schedule:

“LU-3 to LU-12 require four (4) louvres (one per side) at scheduled sizes.”

A3.51 DRAWING M68 – VENTILATION SCHEDULES 2 OF 2

.1 **REVISE:** The Single Duct Variable Volume Terminal Unit Schedule as follows:

ADD: The following heating coil data to all VAV units in the Schedule:

EWT: 82.2 C (180 F)
LWT: 71.1 C (160 F)

.2 **ADD:** The following note to the drawing:

"All terminal units complete with integral sound attenuation to meet scheduled NC values with the exception of corridor terminal units"

A3.52 DRAWING E02 – SINGLE LINE DIAGRAM

.1 **REVISE:** Existing Panel BP-1 surge protection device rating from 300kA to 160kA.

.2 **REVISE**: Existing panel BP-1 surge protection device associated breaker rating from 100A to 60A.

.3 **REVISE**: Existing panel BP-2 surge protection device rating to be changed from 120kA to 160kA.

END OF ADDENDUM NO. 3

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

.1 General Requirements

.1 The specified unit shall be of manufacturer's official product line, designed for commercial and/or industrial 24/7/365 use.

.2 The specified unit shall be based upon standard components and proven technology using open and published protocols.

.2 Sustainability

.1 The specified unit shall be manufactured in accordance with ISO 14001.

.2 The specified unit shall be compliant with the EU directives 2011/65/EU (RoHS) and 2012/19/EU (WEEE).

.3 The specified unit shall be compliant with the EU regulation 1907/2006 (REACH).

.4 The product, including all its components, shall not contain any added PVC.

.5 The specified unit shall be PVC-free in accordance with IEC 61249-2-21.

1.2 CERTIFICATIONS AND STANDARDS

.1 General abbreviations and acronyms

.1 API: Application Programming Interface

.2 Aspect ratio: A ratio of width to height in images

.3 Bit Rate: The number of bits/time unit sent over a network

.4 Bonjour: Enables automatic discovery of computers, devices, and services on IP networks.

.5 DHCP: Dynamic Host Configuration Protocol

.6 DNS: Domain Name System

.7 FPS: Frames per Second

.8 FTP: File Transfer Protocol

.9 H.264 (Video Compression Format)

.10 IEEE 802.1x: Authentication framework for network devices

.11 IP: Internet Protocol

.12 IR light: Infrared light

.13 ISO: International Standards Organization

.14 JPEG: Joint Photographic Experts Group (image format)

.15 LAN: Local Area Network

.16 LED: Light Emitting Diode

.17 Lux: A standard unit of illumination measurement

.18 MBR: Maximum Bit Rate

.19 MPEG: Moving Picture Experts Group

.20 Multicast: Communication between a single sender and multiple receivers on a network

.21 NTP: Network Time Protocol

.22 ONVIF: Global standard for the interface of IP-based physical security products

.23 PoE: Power over Ethernet (IEEE 802.3af/at) standard for providing power over network cable

.24 Progressive scan: An image scanning technology which scans the entire picture

.25 PTZ: Pan/Tilt/Zoom

.26 QoS: Quality of Service

.27 SMPTE: Society of Motion Picture and Television Engineers

.28 SNMP: Simple Network Management Protocol

.29 SSL: Secure Sockets Layer

.30 TCP: Transmission Control Protocol

.31 TLS: Transport Layer Security

.32 Unicast: Communication between a single sender and single receiver on a network

.33 UPnP: Universal Plug and Play

.34 VBR: Variable Bit Rate

.35 VMS: Video Management System

.36 WDR: Wide dynamic range

.2 The specified unit shall carry the following EMC approvals:

.1 EN 55032 Class A

.2 EN 55024

.3 EN 61000-6-1, EN 61000-6-2, EN 61000-3-2, EN 61000-3-3

.4 FCC Part 15 Subpart B Class A

.5 ICES-003 Class A

.6 VCCI Class A

.7 RCM AS/NZS CISPR 32 Class A

.8 KC KN32 Class A

.9 KC KN35

.3 The specified unit shall meet the following product safety standards:

.1 IEC/EN/UL 62368-1

.2 IEC/EN/UL 60950-22

.3 IEC 62471

.4 The specified unit shall meet relevant parts of the following video standards:

.1 SMPTE 296M (HDTV 720p)

.2 SMPTE 274M (HDTV 1080p)

.5 The specified unit shall meet the following standards

.1 MPEG-4:

.1 ISO/IEC 14496-10 Advanced Video Coding (H.264)

.2 Networking:

.1 IEEE 802.3af/802.3at (Power over Ethernet)

.2 IEEE 802.1X (Authentication)

.3 IPv4 (RFC 791)

.4 IPv6 (RFC 2460)

.5 QoS – DiffServ (RFC 2475)

.3 Network video

.1 Relevant ONVIF profile as defined by the ONVIF Organization.

.4 Mechanical Environment:

.1 IEC/EN 60529 IP66 (Ingress protection)

.2 NEMA 250 Type 4X

.3 IEC/EN 62262 IK09

.4 IEC 60068-2-1

.5 IEC 60068-2-2

.6 IEC 60068-2-6

.7 IEC 60068-2-14

.8 IEC 60068-2-27

.9 IEC 60068-2-78

.10 IEC 60721-4-3 Class 4M3

.5 Railway environment:

.1 EN 50121-4

.2 IEC 62236-4

1.3 QUALITY ASSURANCE

.1 The contractor or security sub-contractor shall be a licensed security Contractor with a minimum of five (5) years' experience installing and servicing systems of similar scope and complexity and evidence that is completed at least three (3) projects of similar design and is currently engaged in the installation and maintenance of systems herein described.

.2 All installation, configuration, setup, program and related work shall be performed by electronic technicians thoroughly trained by the manufacturer in the installation and service of the equipment provided.

.3 The contractor or designated sub-contractor shall submit credentials of completed manufacturer certification, verified by a third-party organization, as proof of the knowledge.

.4 The contractor shall provide four (4) current references from clients with systems of similar scope and complexity that became operational in the past three (3) years. At least three (3) of the references shall be utilizing the same system components, in a similar configuration as the proposed system.

.5 The specified unit shall be manufactured in accordance with ISO9001.

1.4 WARRANTY

.1 All security system components and labor furnished by the contractor including wiring, software, hardware and custom parts shall be fully warranted for parts, materials, labor and travel expenses for a minimum of three (3) years from date of the final acceptance of the Video Surveillance System.

.2 The manufacturer shall provide warranty and optional extended warranty for the camera for a total period of maximum five years. If enacted as part of the contract, the contractor will repair or replace parts and/or labor per the warranty for the length of this warranty at no cost to the client.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Cameras shall be IP-based and comply with established network and video standards.

.2 Cameras shall be powered by the switch utilizing the network cable. Power injectors (midspans) shall be provided by the contractor when required for proper operation.

.3 Cameras shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third-party applications.

2.2 VIDEO SURVEILLANCE SCHEDULE

.1 Camera types listed below describing various resolutions, form-factor and features shall be supplied by a single camera manufacturer video surveillance system.

.2 The camera manufacture and model numbers will be as follows:

.1 Exterior panoramic network camera shall be AXIS P3717-PLE.

2.3 VIDEO SURVEILLANCE CAMERAS

.1 Panoramic network camera

.1 The panoramic network camera shall meet or exceed the following design specifications:

.1 The camera shall operate on an open source; Linux-based platform, and including a built-in web server.

.2 The camera shall be equipped with four progressive scan megapixel sensors.

.3 The camera shall provide automatically removable IR-cut filter, providing day/night functionality.

.4 The camera shall provide flexible positioning of four varifocal camera heads.

.5 The camera shall provide the following field of view:

.1 4x 1080p

.1 Horizontal: 96° - 49°

.2 Vertical: 53° - 27°

.3 Diagonal: 113°–55°

.6 The camera shall provide motorized focus and zoom functionality.

.7 The camera shall provide local video storage utilizing a microSD/microSDHC/microSDXC memory card expansion.

.8 The camera shall be manufactured with an IP66-, NEMA 4X- and IK09-rated Die-casted aluminum casing.

.9 The camera shall provide:

.1 Pan ± 90°

.2 Tilt 5° - 65°

.3 Rotate 5° - 95°

.4 Twist ±20°

.2 The panoramic network camera shall meet or exceed the following performance specifications:

.1 Illumination

.1 The camera shall meet or exceed the following illumination specifications:

.1 0.17 lux lux in color

.2 Resolution

.1 The camera shall be designed to provide 4x video streams in HDTV 1080p (1920x1080) at up to 30 frames per second (60Hz mode) or 25 frames per second (50Hz mode) using H.264 or Motion JPEG.

.2 The camera shall support video resolutions including:

.1 1920x1080 (HDTV 1080p)

.2 1280x720 (HDTV 720p)

.3 The camera shall provide both landscape format (4:3 and 16:9 aspect ratio) as well as corridor format (3:4 and 9:16 aspect ratio).

.3 Encoding

.1 The camera shall support the following video encoding algorithms:

.1 Motion JPEG encoding in a selectable range from 1 up to 25/30 frames per second in all resolutions.

.2 Baseline Profile H.264 encoding with motion estimation in up to 25/30 frames per second.

.3 Main Profile H.264 encoding with motion estimation and context-adaptive binary arithmetic coding (CABAC) in up to 25/30 frames per second.

.4 Support High Profile H.264 encoding with motion estimation up to 25/30 frames per second.

.5 Support H.264 with automatic scene adaptive bitrate control in up to 25/30 frames per second.

.2 The camera shall provide independently configured simultaneous H.264 and Motion JPEG streams.

.3 The camera shall in H.264 support Variable Bit Rate (VBR) for video quality adapted to scene content. To protect the network from unexpected bit rate speaks the camera shall support Constant Bit Rate (CBR) or Maximum Bit Rate (MBR).

.4 The camera shall provide configurable compression levels.

.5 Support standard baseline profile H.264 with motion estimation.

.6 Support motion estimation in H.264/MPEG-4 Part 10/AVC.

.7 The camera shall for its H.264 implementation support scene adaptive bitrate control with automatic dynamic ROI to reduce bitrate in unprioritized regions in order to lowering bandwidth and storage requirements.

.4 Transmission

.1 The camera shall allow for video to be transported over:

.1 HTTP (Unicast)

.2 HTTPS (Unicast)

.3 RTP (Unicast & Multicast)

.4 RTP over RTSP (Unicast)

.5 RTP over RTSP over HTTP (Unicast)

.2 The camera shall support Quality of Service (QoS) to be able to prioritize traffic.

.5 Image

.1 The camera shall incorporate automatic and manual white balance.

.2 The camera shall incorporate forensic wide dynamic range functionality.

.3 The camera shall incorporate an electronic shutter operating in the range of:

.1 1/32500 s to 2 s with 50 Hz

.2 1/32500 s to 2 s with 60 Hz

.4 The camera shall incorporate capture mode with the following settings:

.1 HDTV 1080p 25/30 fps

.5 The camera shall support manually defined values for:

.1 Saturation

.2 Contrast

.3 Sharpness

.4 Brightness

.6 The camera shall incorporate a function for optimization of low light behavior.

.7 The camera shall allow for rotation of the image in steps of 90°.

.8 The camera shall incorporate local contrast functionality.

.6 User Interface

.1 Web server

.1 The camera shall contain a built-in web server making video and configuration available to multiple clients in a standard operating system and browser environment using HTTP, without the need for additional software.

.2 Optional components downloaded from the camera for specific tasks shall be signed by an organization providing digital trust services, such as Verisign, Inc.

.2 Language Specification

.1 The camera shall provide a function for altering the language of the user interface, and shall include support for at least 10 different languages.

.3 IP addresses

.1 The camera shall support both fixed IP addresses and dynamically assigned IP addresses provided by a Dynamic Host Control Protocol (DHCP) server.

.2 The camera shall allow for automatic detection of the camera based on UPnP and Bonjour when using a PC with an operating system supporting this feature.

.3 The camera shall provide support for both IPv4 and IPv6.

.7 Event functionality

.1 The camera shall be equipped with an integrated event functionality:

.1 Detectors functionality

.1 Video motion detection

.2 Hardware functionality

.3 Input Signal functionality

.1 Manual trigger / virtual Inputs

.2 Live stream accessed

.3 Camera tampering

.4 Storage functionality

.5 System functionality

.1 Embedded third-party applications

.2 Edge storage fail-over recording detection

.6 Time functionality

.1 Scheduled time

.2 Response to triggers shall include:

.1 Send notification, using FTP, HTTP, HTTPS, SFTP, network share or email

.2 Send images, using FTP, HTTP, HTTPS, SFTP, network share or email

.3 Send video clip, using FTP, HTTP, HTTPS, SFTP, network share or email

.4 Recording to local storage and/or network attached storage

.5 Day and night mode

.6 Overlay Text

.7 Status LED

.3 The camera shall provide memory for pre & post alarm recordings.

.8 Edge storage

.1 The camera shall support continuous and event controlled recording to:

.1 Local memory added to the cameras SD-card slot

.2 Network attached storage, located on the local network

.2 The camera shall incorporate encryption functionality for the SD card.

.3 The camera shall be able to detect and notify edge storage disruptions.

.9 Protocol

.1 The camera shall incorporate support for at least IPv4/v6, HTTP, HTTPS, SSL/TLS, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP, SNMP v1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, SFTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH.

.2 The SMTP implementation shall include support for SMTP authentication.

.10 Text overlay

.1 The camera shall:

.1 Provide embedded on-screen text with support for date & time, and a customer-specific text, camera name, of at least 45 ASCII characters.

.2 Provide the possibility to choose different font sizes for embedded on-screen text, and to use white or black text on at least four different backgrounds.

.3 Provide the ability to manually set up and configure privacy masks to the image.

.4 Allow for the overlay of a graphical image, such as a logotype, into the image.

.11 Security

.1 The camera shall support the use of HTTPS and SSL/TLS, providing the ability to upload signed certificates to encrypt and secure authentication and communication of both administration data and video streams.

.2 The camera shall provide centralized certificate management, with both pre-installed CA certificates and the ability to upload additional CA certificates. The certificates shall be signed by an organization providing digital trust services.

.3 The camera shall support IEEE 802.1X authentication.

.4 The camera shall provide support for restricting access to pre-defined IP addresses only, so-called IP address filtering.

.5 The camera shall restrict access to the built-in web server by usernames and passwords at three different levels.

.12 API support

.1 The camera shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third-party applications.

.2 The camera shall conform to ONVIF profile G as defined by the ONVIF Organization.

.3 The camera shall conform to ONVIF profile S as defined by the ONVIF Organization.

.13 Embedded applications

.1 The camera shall provide a platform allowing the upload of third-party applications into the camera.

.14 Installation and maintenance

.1 The camera shall be supplied with Windows-based management software which allows the assignment of IP addresses, upgrade of firmware and backup of the cameras' configuration.

.2 The camera shall support the use of SNMP-based management tools according to SNMP v1, 2c & 3 / MIB-II.

.3 The camera shall allow updates of the software (firmware) over the network, using FTP or HTTP.

.4 The camera shall provide the ability to apply a rectangle of customer-defined number of pixels to the image, which can be used as a pixel counter identifying the size of objects in number of pixels.

.5 The camera shall provide remote zoom and remote focus functionality.

.6 The camera shall accept external time synchronization from an NTP (Network Time Protocol) server.

.7 The camera shall store all customer-specific settings in a non-volatile memory that shall not be lost during power cuts or soft reset.

.15 Access log

.1 The camera shall provide a log file, containing information about the 250 latest connections and access attempts since the unit's latest restart. The file shall include information about the connecting IP addresses and the time of connecting.

.2 Provide a connection list of all currently connected viewers. The file shall include information about connecting IP address, time of connecting and the type of stream accessed.

.16 Camera diagnostics

.1 The camera shall be equipped with LEDs, capable of providing visible status information. LEDs shall indicate the camera's operational status and provide information about power, communication with receiver, the network status and the camera status.

.2 The camera shall be monitored by a Watchdog functionality, which shall automatically re-initiate processes or restart the unit if a malfunction is detected.

.3 The camera shall send a notification when the unit has re-booted and all services are initialized.

.17 Hardware interfaces

.1 Network interface

.1 The camera shall be equipped with one 10BASE-T/100BASE-TX PoE Ethernet-port, using a standard male RJ45 connector and shall support auto negotiation of network speed (100 MBit/s and 10 MBit/s) and transfer mode (full and half duplex).

.18 Enclosure

.1 The camera shall:

.1 Be manufactured with an IP66-, IP67-, NEMA 4X- and IK09-rated impact-resistant, repaintable aluminium and plastic casing.

.2 Be fitted with polycarbonate hard-coated dome with PC/ASA sunshield.

.19 Power

.1 Power over Ethernet IEEE 802.3af/802.3at Type 2 Class 4

.1 IR illumination on: class 4, typical 11.1 W, max 17.0 W

.2 IR illumination off: class 3, typical 8.6 W, max 11.0 W

.20 Environmental

.1 Operate in a temperature range of -30 °C to +50 °C (-22 °F to 112 °F).

.2 Operate in a humidity range of 10–100% RH (condensing).

PART 3 - EXECUTION

3.1 INSTALLATION

.1 The contractor's or subcontractor's main resources within the project shall carry proper professional certification issued by the manufacturer and verified by a third-party organization to confirm sufficient product and technology knowledge.

.2 The contractor shall carefully follow instructions in documentation provided by the manufacturer to ensure all steps have been taken to provide a reliable, easy-to-operate system.

.3 All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.

.4 All firmware found in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of the Video Management Application (VMA) or Network Video Recorder (NVR).

.5 All equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.

.6 A proper installation shall meet NEC (National Electrical Code – US only) per the guidelines of that year's revision. When properly installed equipment meets Low Voltage, Class 2 classification of the NEC.

END OF SECTION