

SISTEM AMARAN BANJIR MAJLIS BANDARAYA ISKANDAR PUTERI (MBIP) BAGI TEMPOH 24 BULAN

SPESIFIKASI TEKNIKAL

BIL.	BAHAGIAN	MUKA SURAT
A	KERJA AWALAN	2/ P%
B	KERJA-KERJA MEMBEKAL, MEMASANG DAN MENGUJI JALAN SISTEM PEMANTAUAN ARAS AIR	3/ P%
C	KERJA-KERJA MEMBEKAL, MEMASANG DAN MENGUJI JALAN DAN MENTAULIAH DASHBOARD PORTAL, APLIKASI MUDAH ALIH, PERKAKASAN SISTEM DIGITAL DAN SISTEM RANGKAIAN KOMUNIKASI	15/ P%
D	PERKHIDMATAN PENYELENGGARAAN 24 BULAN DAN PROGRAM LATIHAN KESEDARAN MASYARAKAT BERKENAAN SISTEM PEMANTAUAN AIR MBIP	17/ P%
E	PERUNTUKAN SEMENTARA	19/ P%

BIL.	SPESIFIKASI	YA	TIDAK	CATATAN
A	KERJA AWALAN			
A.1	Bon Pelaksanaan - Jaminan bank ; atau - Jaminan insurans			
A.2	Polisi Insurans Kerja dan Tanggungan Awam - Polisi Insurans kerja & tanggungan awam - Polisi pampasan kerja			
A.3	Insurans alat-alat peranti dan perkakasan di tapak			
A.4	Jumlah wang penyediaan Laporan Kemajuan Kerja beserta salinan "soft copy" dalam bentuk CD/disket termasuk gambar-gambar kemajuan kerja (bewarna): SEBELUM, SEMASA & SELEPAS beserta TARIKH mengikut peringkat kerja di setiap lokasi sepanjang tempoh kontrak			
A.5	Jumlah wang penyediaan bagi PPE; safety vest, helmet, boots & tools			
A.6	Kerja Ukur (oleh juru ukur bertauliah) di kawasan kerja termasuk : - Keratan merangkumi "limit of contract" dengan tambahan ukuran 5m kiri dan kanan (limit of contract) - Mengoset semua objek yang berada pada 6.1 (di atas) - Mengambil aras laras permukaan tanah/jalan/parkir/rupa bentuk sediaada - Menyediakan 2 set pelan ukur (hard copy & soft copy) sebelum pembinaan termasuk merandakan jajaran parkir/jalan/parkir cadangan (sebagaimana arahan Pegawai Penguasa @ wakilnya) - Menyediakan 2 set pelan ukur (hard copy & soft copy) selepas pembinaan (pelan as-built) termasuk membuat kiraan kuantiti kerja ditapak untuk item-item yang diarahkan oleh pegawai Penguasa @ wakilnya			
A.7	Pengurusan Trafik (Traffic Management Plan) - Jumlah wang penyediaan bagi peralatan pengurusan trafik - Kerja Pengesahan laluan Trafik oleh (TMP yang berdaftar			

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B	KERJA-KERJA MEMBEKAL, MEMASANG DAN MENGUJI JALAN SISTEM PEMANTAUAN ARAS AIR			
B.1	JALAN ZAPIN 3 (WATER LEVEL, RAIN, CCTV 360°) Kerja-kerja termasuk dengan membekal, memasang, menguji jalan dan mentauliah ;			
B.1.1	Peranti Sensor Paras Air Spesifikasi : - Jenis Sensor : Sensor Aras Air Industri Jenis Radar / Ultrasonik / atau setara - Julat Ukuran : 0 - 10 meter (boleh disesuaikan mengikut keadaan tapak) - Ketepatan Ukuran : +1 mm atau lebih baik - Julat Bekalan Kuasa : 12 - 24V DC - Antara Muka Komunikasi : 4 - 20 mA / RS485 / Modbus RTU - Bahan Sarung (Housing) : PP / Alooi Aluminium / Keluli Tahan Karat - Suhu Operasi : -20 hingga +60 - Tahap Perlindungan : IP68 Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian tapak)			
B.1.2	Peranti Sensor Taburan Hujan Spesifikasi :- - Jenis Sensor : Sensor Hujan Jenis Radar / Tipping Bucket Rain Gauge / Sensor Hujan Optik / atau setara- - Julat Ukuran : 0 - 200 mm/h- - Ketepatan Ukuran : +10%- - Julat Saiz Titisan Hujan : 0.5 - 5.0 mm- - Resolusi Ukuran Hujan : 0.1 mm- - Kekerapan Sampel : 1 saat (1 Hz)- - Antara Muka Komunikasi (Interface) : RS485, RS232, atau SDI-12 (pilih salah satu)- - Protokol Komunikasi : ModBus, NMEA-0183, atau ASCII- - Bekalan Kuasa : 7 - 30V DC- - Tahap Perlindungan : IP65 Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian tapak dan capaian rangkaian)			
B.1.3	Sistem Televisyen Litar tertutup (CCTV) Pintar - 360 darjah + 1TB Micro SD - Camera Image Sensor [Bullet channel] 1/2.5" Progressive Scan CMOS, [PTZ channel] 1/1.2" Progressive Scan CMOS Min. Illumination [Bullet channel] - Color : 0.0005 Lux @ (F1.0, AGC ON), B/W: 0.0001 Lux @ (F1.0, AGC ON), 0 Lux with light, [PTZ channel] -Color : 0.0005 Lux @ (F1.6, AGC ON), B/W: 0.0001 Lux @ (F1.6, AGC ON), 0 lux with IR - Shutter Speed : 1 s to 1/30000 s - Slow Shutter : Yes - Day & Night : [Panoramic channel] Color, [PTZ channel] IR cut filter - Zoom[PTZ channel] : 48 x optical, 16x digital - Max. Resolution : [Panoramic channel] 3680 x 1656, [PTZ channel] 3840 x 2160 - PTZ - Movement Range : (Pan) 360 endless - Movement Range (Tilt) : [Panoramic channel] 12 to 24 [PTZ channel] -20 to 90 - Pan Speed : [PTZ channel] pan speed: configurable from 0.1 to 160 preset speed: 240/s - Tilt Speed : [PTZ channel] tilt speed: configurable from 0.1 to 120/s, preset speed 200/s [Panoramic channel] tilt speed configurable - Proportional Pan [Panoramic channel] No, [PTZ channel] Yes - Presets : 300 - Patrol Scan : 8 patrols, up to 32 presets for each patrol - Pattern Scan : 4 pattern scans, record time over 10 minutes for each scan - Power-off Memory : Yes - Park Action : Preset,pattern scan,patrol scan,auto scan,tilt scan,random scan,frame scan,panorama scan - 3D Positioning : Yes - PTZ Status Display : Yes - Preset Freezing : Yes - Scheduled Task : Preset,pattern scan,patrol scan,auto scan,tilt scan,random scan,frame scan,panorama scan,dome reboot,dome adjust,aux output - Deep Learning Function - Face Capture : Detects up to 30 faces simultaneously, Uploads face with background and closed-up face pictures - Face Comparison : Up to 10 face libraries. 30000 faces for each library. 150000 faces in total. Recognizes face identity via face modeling, grading and comparing to those in face library, Supports face library encryption - Road Traffic and Vehicle Detection - Smart Function : Support license plate recognition of vehicles and motorcycles (only in checkpoint scenario) Support vehicle attribute detection, including vehicle type, color, brand, driving direction, etc. Support vehicle and non-vehicle counting - Blocklist and allowlist: up to 10,000 records - LPR Countries/Regions : 4 areas (Europe, Middle East, Asia-Pacific, Africa) and more than 124 countries/regions - Accuracy (Under recommended installation and lighting conditions) : License plate recognition rate 98%, Capture rate 99%, Driving direction accuracy rate 98% - Vehicle Capture Speed : Front installation in checkpoint scenario: up to 120 km/h - Side installation : up to 80 km/h - Capture Mode : License Plate and Vehicle Mode, Vehicle Priority Mode - Multi-Target-Type Detection Supports simultaneous detection and capture of human body, face and vehicle, Gets 7 face features, 14 human body features and 8 vehicle features - Perimeter Protection Line crossing detection, region entrance detection, intrusion detection, region exiting detection			
B.1.4	Papan Tanda Spesifikasi : - Saiz : 900mm (T) x 400mm (L) Ketebalan: Min 3mm - Pelekat: vinly reflektif - Pemasangan : Dinding pagar anti-climb			
B.1.5	Tiang besi hollow bergalvanize dan berlengan Spesifikasi : - Saiz tiang hollow : 80mm x 80mm - Tebal : 1mm - Tinggi : 5m - Saiz lengan hollow : 50mm x 50mm - Panjang : 4000mm - Tebal : 1mm			

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B.1.6	Tiang Besi Bertulang Spesifikasi : Saiz : 150mm tebal beserta 2 lapis BRC A6 dan lapisan hardcore 100mm serta kerja berkaitan			
B.1.7	Pagar bergalvanize Spesifikasi : - Material: galvanize dan berkunci :1800mm (lebar) x 1600mm (tinggi) beserta pagar dawai duri - Pintu : 1 unit			
B.1.8	Set sistem solar dan bateri Spesifikasi: - Bateri : Rechargeable Sealed Lead Acid (SLA),12v 40AH - Solar : Monocrystalline panel,100watt - Solar controller : MPPT,10a			
B.1.9	Sistem rak, sokongan dan aksesori kalis air Saiz: 600mm(P) x 500mm(T) x 300mm (L), IP66			
B.2	KAMPUNG BATU 8 1/2 (JALAN KILANG NENAS)(WATER LEVEL, RAIN, CCTV 360°) Kerja-kerja termasuk dengan membekal, memasang, menguji jalan dan mentauliah ;			
B.2.1	Peranti Sensor Paras Air Spesifikasi: - Jenis Sensor : Sensor Aras Air Industri Jenis Radar / Ultrasonik / atau setara- - Julat Ukuran : 0 - 10 meter (boleh disesuaikan mengikut keadaan tapak)- - Ketepatan Ukuran : +1 mm atau lebih baik- - Julat Bekalan Kuasa : 12 - 24V DC- - Antara Muka Komunikasi: 4 - 20 mA / RS485 / Modbus RTU- - Bahan Sarung (Housing) : PP / AloI Aluminium / Keluli Tahan Karat - Suhu Operasi : -20C hingga +60C - Tahap Perlindungan : IP68 Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian tapak)			
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B.2.6	Lantai Konkrit Bertulang Spesifikasi : Saiz : 150mm tebal beserta 2 lapis BRC A6 dan lapisan hardcore 100mm serta kerja berkaitan			
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B.2.9	Sistem rak, sokongan dan aksesori kalis air Saiz: 600mm(P) x 500mm(T) x 300mm (L), IP66			
B.3	TAMAN DAMAI JAYA (JALAN MAKMUR 12)(WATER LEVEL, RAIN, CCTV 360°) Kerja-kerja termasuk dengan membekal, memasang, menguji jalan dan mentauliah ;			

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B.4	KAMPUNG TUAH JAYA (WATER LEVEL, RAIN, CCTV 360°, SIREN) Kerja-kerja termasuk dengan membekal, memasang, menguji jalan dan mentauliah ;			
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B.4.8	Set Sistem Solar dan bateri Spesifikasi : • Bateri : Rechargable Sealed Lead Acid (SLA),12v-24v 40AH • Solar : Monocrystalline panel,100watt • Solar controller : MPPT,10a			
B.4.9	Sistem rak, sokongan dan aksesori kalis air • Saiz: 600mm(P) x 500mm(T) x 300mm (L), IP66			
B.4.10	Sistem Siren Spesifikasi: • Jenis : Siren Amaran Luar Bangunan 360 • Konfigurasi : 1 Set = 4 Unit Siren (4 unit = 1 set) • Jenis Kawalan : Kawalan Hidup/Mati (On/Off) dari jauh melalui Papan Pemuka Web serta pengaktifan automatik berdasarkan nilai bacaan sensor (Sensor Hujan dan Sensor Paras Air) • Bahan : (Perumah dan Ruang Gegaran) Diperbuat daripada ABS (Acrylonitrile Butadiene Styrene) berketahanan tinggi terhadap hentakan • Suhu Operasi : -25C hingga +50C(persekitaran luar) • Tahap Perlindungan : IP65 • Pematuhan Piawaian : Mematuhi Arahan RoHS (Restriction of Hazardous Substances) • Bekalan Kuasa : DC 12V - 24V • Penggunaan Arus Maksimum : 2.63 A (maksimum) • Tahap Bunyi : Sehingga 123 dB @ 1 meter (dengan corak bunyi terbina dalam yang boleh dipilih) • Fungsi Utama : Aktif secara manual melalui papan pemuka dan automatik melalui integrasi IoT (rule chain) dengan sensor hujan dan sensor aras air. Boleh dikawal dari jauh menggunakan aplikasi web dan mudah alih. • Jenis Pemasangan : Dipasang pada tiang (pole-mounted) dengan liputan bunyi 360 Pengawal (Controller) : • Jenis Komunikasi : WIFI / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian dan capaian rangkaian di tapak)			
B.5	SILC (JALAN SILC 2/3)(WATER QUALITY, CCTV 360°) Kerja-kerja termasuk dengan membekal, memasang, menguji jalan dan mentauliah ;			

BIL.	SPEKIFIKASI	YA	TIDAK	CATATAN
B.5.1	Peranti Sensor Kualiti Air Spesifikasi : - Jenis Sensor : Sensor Kualiti Air Pelbagai Parameter (Mematuhi Indeks Kualiti Air - WQI Malaysia, Jabatan Alam Sekitar) - Pematuhan Piawaian : Sensor mestilah mampu mengukur enam (6) parameter utama seperti yang ditetapkan oleh Jabatan Alam Sekitar (DOE) Malaysia bagi pengiraan Indeks Kualiti Air (WQI) - Parameter (6 WQI Utama) : 1. Dissolved Oxygen (DO) - Oksigen Terlarut 2. pH - Tahap Keasidan/Kealkalian 3. Biological Oxygen Demand (BOD) - Permintaan Oksigen Biologi 4. Chemical Oxygen Demand (COD) - Permintaan Oksigen Kimia 5. Ammoniacal Nitrogen (NH-N) -Nitrogen Ammonia 6. Total Suspended Solids (TSS) - Jumlah Pepejal Tersuspensi - Parameter Tambahan : Suhu - Controller: MIQ/TC 2020 3G-CR3 - Multi-parameter measuring converter, for connecting up to 20 IQ sensors. -WTW 109170 SensoLyt 700 IQ (pH) Robust digital pH/ORP sensor for pH/ORP electrodes SensoLyt SEA/DWA/ECA/PIA for use with the IQ SENSOR NET. Measuring method: Potentiometric ; Measuring range:0 - 14pH -WTW 600012 Visolid 700 IQ (FREE-CAL) Digital suspended solids sensor for water/wastewater/sludge (ultrasonic cleaning) for use with the IQ SENSOR NET system -WTW 201650 FDO 700 IQ Digital calibration free optical D.O. sensor (universal use). Optimized for monitoring/controlling the O2 input in wastewater treatment plants, for use with IQ SENSOR NET. -WTW 201654 SC-FDO 700 (Dissolved oxygen) Universal sensor cap for 700 IQ -WTW VARiON Plus A comp SET NH4/CompRobust digital ammonium sensor for ion-selective electrodes (in-situ measuring), for use with the IQ SENSOR NET system, delivered with VARiON Ref, VARiON Plus NH4 and VARiON Plus K electrodes. With built-in lightning protection, pre-amplifier and temperature sensor. -WTW 481048 CarboVis 701 IQ: Optical COD/TOC/DOC/BOD or SAC sensor (60 mm) with spectral processing of the UV-VIS range, for measurement in the inlet/effluent/BNR part of municipal wastewater treatment plants with integrated ultrasonic cleaning. -WTW 480042 SACIQ-7.0: Sensor adapter cable for all IQ sensors, with IP 68 waterproof connection to the IQ SENSOR NET system. Cable length 7m -Buffer Solutions - Ketepatan Ukuran : +0.1 mg/L (DO), +0.2 pH, +5% daripada bacaan (parameter lain) - Isyarat Keluaran (Output Signal) : RS485 / Modbus RTU / 4 - 20 mA - Bekalan Kuasa : DC 12V - 24V - Bahan Probe : Keluli Tahan Karat (Stainless Steel) / PVC tahan kakisan - Tahap Perlindungan : IP68 (boleh direndam sepenuhnya di dalam air) - Jenis Pemasangan : Direndam (submersible) atau dipasang secara tetap di platform pemantauan - Penentukuran (Calibration) : Ditala di kilang (factory calibrated) dengan pilihan penentukuran semula di lapangan (field re-calibration) Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian dan capaian rangkaian di lokasi pemasangan)			
B.5.2	Sistem Televisyen Litar tertutup (CCTV) Pintar - 360 darjah + 1TB Micro SD - Camera Image Sensor : [Bullet channel] 1/2.5" Progressive Scan CMOS, [PTZ channel] 1/1.2" Progressive Scan CMOS Min. Illumination : [Bullet channel] Color: 0.0005 Lux @ (F1.0, AGC ON), B/W: 0.0001 Lux @ (F1.0, AGC ON), 0 Lux with light, [PTZ channel] Color : 0.0005 Lux @ (F1.6, AGC ON), B/W: 0.0001 Lux @ (F1.6, AGC ON), 0 lux with IR - Shutter Speed : 1s to 1/300000s - Slow Shutter : Yes - Day & Night : [Panoramic channel] Color, [PTZ channel] IR cut filter - Zoom [PTZ channel] 48 x optical, 16 x digital - Max. Resolution : [Panoramic channel] 3680 x 1656, [PTZ channel] 3840 x 2160 - PTZ - Movement Range (Pan) : 360 endless - Movement Range (Tilt) : [Panoramic channel] 12 to 24, [PTZ channel] -20 to 90 - Pan Speed [PTZ channel] pan speed : configurable from 0.1 to 160/s, preset speed: 240/s - Tilt Speed [PTZ channel] tilt speed : configurable from 0.1 to 120/s, preset speed 200/s, [Panoramic channel] tilt speed configurable - Proportional Pan [Panoramic channel] No, [PTZ channel] Yes - Presets : 300 - Patrol Scan : 8 patrols, up to 32 presets for each patrol - Pattern Scan : 4 pattern scans, record time over 10 minutes for each scan - Power-off Memory : Yes - Park Action : Preset, pattern scan, patrol scan, auto scan, tilt scan, random scan, frame scan, panorama scan - 3D Positioning : Yes - PTZ Status Display : Yes - Preset Freezing : Yes - Scheduled Task : Preset, pattern scan, patrol scan, auto scan, tilt scan, random scan, frame scan, panorama scan, dome reboot, dome adjust, aux output - Deep Learning Function - Face Capture : Detects up to 30 faces simultaneously, Uploads face with background and closed-up face pictures Face Comparison : Up to 10 face libraries. 30000 faces for each library. 150000 faces in total, Recognizes face identity via face modeling, grading and comparing to those in face library, Supports face library encryption - Road Traffic and Vehicle Detection - Smart Function : Support license plate recognition of vehicles and motorcycles (only in checkpoint scenario) Support vehicle attribute detection, including vehicle type, color, brand, driving direction, etc. Support vehicle and non-vehicle counting - Blocklist and allowlist : up to 10,000 records - LPR Countries/Regions : 4 areas (Europe, Middle East, Asia-Pacific, Africa) and more than 124 countries/regions - Accuracy (Under recommended installation and lighting conditions): License plate recognition rate 98%, Capture rate 99%, - Driving direction accuracy rate 98% - Vehicle Capture Speed: Front installation in checkpoint scenario: up to 120 km/h - Side installation: up to 80 km/h - Capture Mode : License Plate and Vehicle Mode, Vehicle Priority Mode - Multi-Target-Type Detection : Supports simultaneous detection and capture of human body, face and vehicle, Gets 7 face features, 14 human body features and 8 vehicle features - Perimeter Protection : Line crossing detection, region entrance detection, intrusion detection, region exiting detection			

BIL.	SPESIFIKASI	YA	TIDAK	CATATAN
B.5.3	Papan Tanda Spesifikasi : - Saiz : 900mm (T) x 400mm (L) Ketebalan: Min 3mm - - Pelekat: vinly reflektif - Pemasangan: Dinding pagar anti-climb			
B.5.4	Tiang besi hollow bergalvanize dan berlengan berserta perangkap sampah Spesifikasi : - Saiz tiang hollow : 80mm x 80mm - Tebal : 1mm - Tinggi : 10m - Saiz lengan hollow : 50mm x 50mm - Panjang : 4000mm - Tebal : 1mm			
B.5.5	Lantai Konkrit Bertulang Spesifikasi: Saiz: 150mm tebal beserta 2 lapis BRC A6 dan lapisan hardcore 100mm serta kerja berkaitan			
B.5.6	Pagar bergalvanize Spesifikasi : - Material : galvenize dan berkunci :1800mm (lebar) x 1600mm (tinggi) berserta pagar dawai duri - Pintu : 1 unit			
B.5.7	Set Sistem Solar dan bateri Spesifikasi: - Bateri: Rechargable Sealed Lead Acid (SLA),12v 100AH (4) - Solar: Monocrystalline panel,600watt - Solar controller: MPPT,30a			
B.5.8	Sistem rak, sokongan dan aksesori kalis air Saiz : 800mm(P) x 800mm(T) x 250mm (L), IP66			
B.6	NUSAJAYA INDUSTRIAL PARK 2 (JALAN BAYU 3/14)(AIR QUALITY) Kerja-kerja termasuk dengan membekal, memasang, menguji jalan dan mentauliah ;			
B.6.1	Peranti Sensor Kualiti Udara (Pemantauan Bau) Specification : - Jenis Sensor : Sensor Kualiti Udara Pelbagai Gas (IoT Bersepadu) untuk Pemantauan Bau - Fungsi Utama : Mengesan dan mengukur kepekatan gas yang menyebabkan bau busuk (malodorous compounds) di kawasan sekitar industri, tapak pelupusan sampah, atau loji kumbahan - Gas / Parameter Sasaran: - Hidrogen Sulfida - Ammonia - Sebatian Organik Meruap (VOC Volatile Organic Compounds) -jumlah keseluruhan atau jenis tertentu - Metana Julat Ukuran : - Hidrogen Sulfida : range: 0-100ppm, accuracy : +3%, resolution : 0.1ppm - Ammonia : range: 0-100ppm, accuracy : +3%, resolution : 0.1ppm - Volatile Organic Compounds (VOC) : range: 0-1000ppm, accuracy : +3%, resolution : 1ppm - Methane : range: 0-10000ppm, accuracy: +3%, resolution : 1ppm - Ketepatan / Resolusi Ukuran : +2% Skala Penuh (FS) atau lebih baik / Resolusi 0.1 ppm - Prinsip Pengesanan : Elektrokimia dan PID (Photo-Ionization Detector) untuk VOC - Masa Tindak Balas (T90) : <30 saat - Isyarat Keluaran (Output Signal) : RS485 / Modbus RTU / 4 - 20 mA - Bekalan Kuasa : 12 -24V DC - Bahan Perumah (Housing) : Aloji Aluminium / ABS tahan UV - Penarafan Perumah (Enclosure Rating) : IP65 atau lebih baik (sesuai untuk penggunaan luar bangunan) - Suhu Operasi : -20C hingga +55C Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian tapak dan capaian rangkaian)			
B.6.2	Papan Tanda Spesifikasi : - Saiz : 900mm (T) x 400mm (L) Ketebalan: Min 3mm - Pelekat: vinly reflektif - Pemasangan : Dinding pagar anti-climb			
B.6.3	Tiang besi hollow bergalvanize dan berlengan Spesifikasi : - Saiz tiang hollow : 80mm x 80mm - Tebal : 1mm - Tinggi: 5m - Saiz lengan hollow : 50mm x 50mm - Panjang: 4000mm - Tebal: 1mm			

BIL.	SPESIFIKASI	YA	TIDAK	CATATAN
B.6.4	Lantai Konkrit Bertulang Spesifikasi : Saiz : 150mm tebal beserta 2 lapis BRC A6 dan lapisan hardcore 100mm serta kerja berkaitan			
B.6.5	Pagar bergalvanize Spesifikasi : - Material : galvenize dan berkunci : 1800mm (lebar) x 1600mm (tinggi) beserta pagar dawai duri - Pintu : 1 unit			
B.6.6	Set Sistem Solar dan bateri Spesifikasi : - Bateri : Rechargeable Sealed Lead Acid (SLA),12v 40A - Solar : Monocrystalline panel,100watt - Solar controller: MPPT,10a			
B.6.7	Sistem rak, sokongan dan aksesori kalis air Saiz : 600mm(P) x 500mm(T) x 300mm (L), IP66			
B.7	KAMPUNG BARU MUFAKAT (WATER LEVEL, RAIN, CCTV 360°, SIREN) Kerja-kerja termasuk dengan membekal, memasang, mengujijalan dan mentauliah ;			
B.7.1	Peranti Sensor Paras Air Spesifikasi : - Jenis Sensor : Sensor Aras Air Industri Jenis Radar / Ultrasonik / atau setara - Julat Ukuran : 0 -10 meter (boleh disesuaikan mengikut keadaan tapak) - Ketepatan Ukuran : +1 mm atau lebih baik - Julat Bekalan Kuasa : 12 - 24V DC - Antara Muka Komunikasi : 4 - 20 mA / RS485 / Modbus RTU - Bahan Sarung (Housing) : PP / AloI Aluminium / Keluli Tahan Karat - Suhu Operasi : -20C hingga +60C - Tahap Perlindungan : IP68 Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian tapak)			
B.7.2	Peranti Sensor Taburan Hujan Spesifikasi : - Jenis Sensor : Sensor Hujan Jenis Radar / Tipping Bucket Rain Gauge / Sensor Hujan Optik / atau setara - Julat Ukuran : 0 - 200 mm/h - Ketepatan Ukuran : +10% - Julat Saiz Titisan Hujan : 0.5 - 5.0 mm - Resolusi Ukuran Hujan : 0.1 mm - Kekerapan Sampel : 1 saat (1 Hz) - Antara Muka Komunikasi (Interface) : RS485, RS232, atau SDI-12 (pilih salah satu) - Protokol Komunikasi : ModBus, NMEA-0183, atau ASCII - Bekalan Kuasa : 7 - 30V DC - Tahap Perlindungan : IP65 Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian tapak dan capaian rangkaian)			

BIL.	SPEKIFIKASI	YA	TIDAK	CATATAN
B.7.3	Sistem Televisyen Litar tertutup (CCTV) Pintar - 360 darjah + 1TB Micro SD • Camera Image Sensor : [Bullet channel] 1/2.5" Progressive Scan CMOS, [PTZ channel] 1/1.2" Progressive Scan CMOS - Min. Illumination : [Bullet channel] Color: 0.0005 Lux @ (F1.0, AGC ON), B/W: 0.0001 Lux @ (F1.0, AGC ON), 0 Lux with light, [PTZ channel] Color : 0.0005 Lux @ (F1.6, AGC ON), B/W: 0.0001 Lux @ (F1.6, AGC ON), 0 lux with IR - Shutter Speed : 1s to 1/30000s - Slow Shutter : Yes - Day & Night : [Panoramic channel] Color, [PTZ channel] IR cut filter - Zoom[PTZ channel] 48 x optical, 16 x digital - Max. Resolution : [Panoramic channel] 3680 x 1656, [PTZ channel] 3840 x 2160 • PTZ - Movement Range (Pan) : 360 endless - Movement Range (Tilt) : [Panoramic channel] 12 to 24, [PTZ channel] -20 to 90 - Pan Speed [PTZ channel] pan speed : configurable from 0.1 to 160/s, preset speed: 240/s - Tilt Speed [PTZ channel] tilt speed : configurable from 0.1 to 120/s, preset speed 200/s, [Panoramic channel] tilt speed configurable - Proportional Pan [Panoramic channel] No, [PTZ channel] Yes - Presets : 300 - Patrol Scan : 8 patrols, up to 32 presets for each patrol - Pattern Scan : 4 pattern scans, record time over 10 minutes for each scan - Power-off Memory : Yes • Park Action : Preset, pattern scan, patrol scan, auto scan, tilt scan, random scan, frame scan, panorama scan - 3D Positioning : Yes - PTZ Status Display : Yes - Preset Freezing : Yes - Scheduled Task : Preset, pattern scan, patrol scan, auto scan, tilt scan, random scan, frame scan, panorama scan, dome reboot, dome adjust, aux output • Deep Learning Function - Face Capture : Detects up to 30 faces simultaneously, Uploads face with background and closed-up face pictures - Face Comparison : Up to 10 face libraries, 30000 faces for each library. 150000 faces in total, Recognizes face identity via face modeling, grading and comparing to those in face library, Supports face library encryption • Road Traffic and Vehicle Detection - Smart Function : Support license plate recognition of vehicles and motorcycles (only in checkpoint scenario) Support vehicle attribute detection, including vehicle type, color, brand, driving direction, etc. Support vehicle and non-vehicle counting - Blocklist and allowlist : up to 10,000 records - LPR Countries/Regions : 4 areas (Europe, Middle East, Asia-Pacific, Africa) and more than 124 countries/regions - Accuracy (Under recommended installation and lighting conditions): License plate recognition rate 98%, Capture rate 99%, - Driving direction accuracy rate 98% - Vehicle Capture Speed: Front installation in checkpoint scenario: up to 120 km/h - Side installation: up to 80 km/h - Capture Mode : License Plate and Vehicle Mode, Vehicle Priority Mode • Multi-Target-Type Detection : Supports simultaneous detection and capture of human body, face and vehicle, Gets 7 face features, 14 human body features and 8 vehicle features - Perimeter Protection : Line crossing detection, region entrance detection, intrusion detection, region exiting detection			
B.7.4	Sistem Siren Spesifikasi: • Jenis : Siren Amaran Luar Bangunan 360 (Kawalan IoT) • Konfigurasi : 1 Set = 4 Unit Siren (4 unit = 1 set) • Jenis Kawalan : Kawalan Hidup/Mati (On/Off) dari jauh melalui Papan Pemuka Web serta pengaktifan automatik berdasarkan nilai bacaan sensor (Sensor Hujan dan Sensor Paras Air) • Bahan : (Perumah dan Ruang Gegeran) Diperbuat daripada ABS (Acrylonitrile Butadiene Styrene) berketahanan tinggi terhadap hentakan • Suhu Operasi : -25C hingga +50C(persekitaran luar) • Tahap Perlindungan : IP65 • Pematuhan Piawaian : Mematuhi Arahan RoHS (Restriction of Hazardous Substances) • Bekalan Kuasa : DC 12V - 24V • Penggunaan Arus Maksimum : 2.63 A (maksimum) • Tahap Bunyi : Sehingga 123 dB @ 1 meter (dengan corak bunyi terbina dalam yang boleh dipilih) • Fungsi Utama : Aktif secara manual melalui papan pemuka dan automatik melalui integrasi IoT (rule chain) dengan sensor hujan dan sensor aras air. Boleh dikawal dari jauh menggunakan aplikasi web dan mudah alih. • Jenis Pemasangan : Dipasang pada tiang (pole-mounted) dengan liputan bunyi 360 Pengawal (Controller) : • Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian dan capaian rangkaian di tapak)			
B.7.5	Papan Tanda Spesifikasi : • Saiz : 900mm (T) x 400mm (L) Ketebalan: Min 3mm - Pelekat: vinly reflektif • Pemasangan : Dinding pagar anti-climb			
B.7.6	Tiang besi hollow bergalvanize dan berelengan Spesifikasi : • Saiz tiang hollow : 80mm x 80mm • Tebal : 1mm • Tinggi : 5m • Saiz lengan hollow : 50mm x 50mm • Panjang : 4000mm • Tebal : 1mm			
B.7.7	Lantai Konkrit Bertulang Spesifikasi : • Saiz: 150mm tebal beserta 2 lapis BRC A6 dan lapisan hardcore 100mm serta kerja berkaitan			
B.7.8	Pagar bergalvanize Spesifikasi : • Material : galvenize dan berkunci :1800mm (lebar) x 1600mm (tinggi) beserta pagar dawai duri • Pintu: 1 unit			

BIL.	SPEKIFIKASI	YA	TIDAK	CATATAN
B.7.9	Set sistem solar dan bateri Spesifikasi : - Bateri : Rechargeable Sealed Lead Acid (SLA),12v-24v 40AH - Solar Panel : Monocrystalline panel,100watt - Solar controller : MPPT,10a			
B.7.10	Sistem rak, sokongan dan aksesori kalis air Saiz : 600mm(P) x 500mm(T) x 300mm (L), IP66			
B.8	PERSIARAN LAYAR PERAK(WATER LEVEL, RAIN, CCTV 360°) Kerja-kerja termasuk dengan membekal, memasang, mengujijalan dan mentauliah;			
B.8.1	Peranti Sensor Paras Air Spesifikasi : - Jenis Sensor : Sensor Aras Air Industri Jenis Radar / Ultrasonik / atau setara - Julat Ukuran : 0 - 10 meter (boleh disesuaikan mengikut keadaan tapak) - Ketepatan Ukuran : +1 mm atau lebih baik - Julat Bekalan Kuasa : 12 - 24V DC - Antara Muka Komunikasi : 4 - 20 mA / RS485 / Modbus RTU - Bahan Sarung (Housing) : PP / AloI Aluminium / Keluli Tahan Karat - Suhu Operasi : -20C hingga +60C - Tahap Perlindungan : IP68 Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian tapak)			
B.8.2	Peranti Sensor Taburan Hujan Spesifikasi : - Jenis Sensor : Sensor Hujan Jenis Radar / Tipping Bucket Rain Gauge / Sensor Hujan Optik / atau setara - Julat Ukuran : 0 - 200 mm/h - Ketepatan Ukuran : +10% - Julat Saiz Titisan Hujan : 0.5 - 5.0 mm - Resolusi Ukuran Hujan : 0.1 mm - Kekerapan Sampel : 1 saat (1 Hz) - Antara Muka Komunikasi (Interface) : RS485, RS232, atau SDI-12 (pilih salah satu) - Protokol Komunikasi : ModBus, NMEA-0183, atau ASCII - Bekalan Kuasa : 7 - 30V DC - Tahap Perlindungan : IP65 Pengawal (Controller) : - Jenis Komunikasi : WiFi / 4G / LoRa / NB-IoT (bergantung kepada kesesuaian tapak dan capaian rangkaian)			
B.8.3	Sistem Televisyen Litar tertutup (CCTV) Pintar - 360 darjah + 1TB Micro SD - Camera Image Sensor : [Bullet channel] 1/2.5" Progressive Scan CMOS, [PTZ channel] 1/1.2" Progressive Scan CMOS - Min. Illumination : [Bullet channel] Color: 0.0005 Lux @ (F1.0, AGC ON), B/W: 0.0001 Lux @ (F1.0, AGC ON), 0 Lux with light. [PTZ channel] Color : 0.0005 Lux @ (F1.6, AGC ON), B/W: 0.0001 Lux @ (F1.6, AGC ON), 0 lux with IR - Shutter Speed : 1s to 1/30000s - Slow Shutter : Yes - Day & Night : [Panoramic channel] Color, [PTZ channel] IR cut filter - Zoom[PTZ channel] 48 x optical, 16 x digital - Max. Resolution : [Panoramic channel] 3680 x 1656, [PTZ channel] 3840 x 2160 • PTZ - Movement Range (Pan) : 360 endless - Movement Range (Tilt) : [Panoramic channel] 12 to 24, [PTZ channel] -20 to 90 - Pan Speed [PTZ channel] pan speed : configurable from 0.1 to 160/s, preset speed: 240/s - Tilt Speed [PTZ channel] tilt speed : configurable from 0.1 to 120/s, preset speed 200/s, [Panoramic channel] tilt speed configurable - Proportional Pan [Panoramic channel] No, [PTZ channel] Yes - Presets : 300 - Patrol Scan : 8 patrols, up to 32 presets for each patrol - Pattern Scan : 4 pattern scans, record time over 10 minutes for each scan - Power-off Memory : Yes • Park Action : Preset,pattern scan,patrol scan,auto scan,tilt scan,random scan,frame scan,panorama scan - 3D Positioning : Yes - PTZ Status Display : Yes - Preset Freezing : Yes - Scheduled Task : Preset,pattern scan,patrol scan,auto scan,tilt scan,random scan,frame scan,panorama scan,dome reboot,dome adjust,aux output • Deep Learning Function - Face Capture : Detects up to 30 faces simultaneously. Uploads face with background and closed-up face pictures - Face Comparison : Up to 10 face libraries. 30000 faces for each library. 150000 faces in total, Recognizes face identity via face modeling, grading and comparing to those in face library, Supports face library encryption • Road Traffic and Vehicle Detection - Smart Function : Support license plate recognition of vehicles and motorcycles (only in checkpoint scenario) Support vehicle attribute detection, including vehicle type, color, brand, driving direction, etc. Support vehicle and non-vehicle counting - Blocklist and allowlist : up to 10,000 records - LPR Countries/Regions : 4 areas (Europe, Middle East, Asia-Pacific, Africa) and more than 124 countries/regions - Accuracy (Under recommended installation and lighting conditions): License plate recognition rate 98%, Capture rate 99%, - Driving direction accuracy rate 98% - Vehicle Capture Speed: Front installation in checkpoint scenario: up to 120 km/h - Side installation: up to 80 km/h - Capture Mode : License Plate and Vehicle Mode, Vehicle Priority Mode • Multi-Target-Type Detection : Supports simultaneous detection and capture of human body, face and vehicle, Gets 7 face features, 14 human body features and 8 vehicle features - Perimeter Protection : Line crossing detection, region entrance detection, intrusion detection, region exiting detection			
B.8.4	Papan tanda Spesifikasi : - Saiz: 900mm (T) x 400mm (L) Ketebalan: Min 3mm - Pelekat: vinyl reflektif - Pemasangan: Dinding pagar anti-climb			

BIL.	SPESIFIKASI	YA	TIDAK	CATATAN
B.8.5	Tiang besi hollow bergalvanize dan berlengan Spesifikasi : • Saiz tiang hollow : 80mm x 80mm • Tebal : 1mm • Tinggi : 5m • Saiz lengan hollow : 50mm x 50mm • Panjang : 4000mm • Tebal : 1mm			
B.8.6	Lantai Konkrit Bertulang Spesifikasi : • Saiz : 150mm tebal beserta 2 lapis BRC A6 dan lapisan hardcore 100mm serta kerja berkaitan			
B.8.7	Pagar bergalvanize Spesifikasi : • Material : galvenize dan berkunci :1800mm (lebar) x 1600mm (tinggi) beserta pagar dawai duri • Pintu : 1 unit			
B.8.8	Set sistem solar dan bateri Spesifikasi : • Bateri : Rechargable Sealed Lead Acid (SLA),12v 40AH • Solar Panel : Monocrystalline panel,100watt • Solar controller: MPPT,10a			
B.8.9	Sistem rak, sokongan dan aksesori kalis air • Saiz : 600mm(P) x 500mm(T) x 300mm (L), IP66			

BIL.	SPESIFIKASI	YA	TIDAK	CATATAN
C	KERJA-KERJA MEMBEKAL, MEMASANG DAN MENGUJIJALAN DAN MENTAULIAH DASHBOARD PORTAL, APLIKASI MUDAH ALIH, PERKAKASAN SISTEM DIGITAL DAN SISTEM RANGKAIAN KOMUNIKASI			
C.1	DASHBOARD & APLIKASI MUDAH ALIH			
C.1.1	IOT Platform • Langganan IoT Platform (Cloud-based) selama dua puluh empat (24) bulan dengan keupayaan berintegrasi dengan peranti Water Level, Water Quality, Air Quality, Rain Gauge dan Siren • Semua peranti hendaklah menghantar data secara automatik ke platform pemantauan IoT (Cloud IoT Dashboard) dan boleh diakses melalui laman web serta mobile app			
C.1.2	Pemantauan data secara real-time • Pemantauan dan paparan data Water Level, Rainfall Intensity, Water Quality Index (WQI), Air Quality dan Siren secara-real time melalui dashboard dan mobile app. Sistem juga mampu memaparkan bacaan parameter terperinci daripada sensor-sensor tersebut.			
C.1.3	Konfigurasi API • Konfigurasi API bagi tujuan integrasi sistem untuk penerimaan, penyimpanan dan paparan data daripada sensor			
C.1.4	Perkhidmatan Notifikasi dan Kawalan Siren Keupayaan sistem dan mobile app untuk : • Menghantar notifikasi amaran kepada pengguna berdasarkan nilai ambang (threshold) yang ditetapkan • Mengawal fungsi on/off Siren secara remote			
C.1.5	Penyimpanan Data (Data Logging) • Data bacaan mestilah disimpan secara automatik di pangkalan data awan (cloud database) sekurang-kurangnya 2 tahun untuk tujuan analisis dan audit.			
C.1.6	Laporan & Analitik • Sistem perlu mempunyai keupayaan muat turun data (CSV/Excel) serta menjana laporan prestasi dan amaran automatik.			
C.1.7	Domain bersama SSL Certificate (SSL/TLS) • Penyediaan domain bagi sistem lengkap dengan sijil keselamatan SSL/TLS. • Sambungan data antara pelayan dan pengguna mesti dilindungi menggunakan penyulitan SSL/TLS bagi memastikan kerahsiaan dan integriti data. • Akses sistem hanya dibenarkan kepada pengguna berdaftar (authenticated users) sahaja.			
C.1.8	Integrasi API • Integrasi API data sensor ke dalam Dashboard MBIP bagi tujuan pemantauan menyeluruh			
C.2	PERKHIDMATAN SERVER HOSTING - co hosting			
C.2.1	a) dashboard (1 VM System, 1 VM DB) [4 CPU, 16GB, 150GB] * 24 bulan			
C.2.2	b) Software subscription Teltonika RMS (3 Years Subscription)			
C.3	MEMBEKAL, MEMASANG & MENTAULIAH PERKAKASAN BAGI DASHBOARD MBIP			
C.3.1	Smart Board - 50" • Samsung SmartBoard LH55WMB-WBGC come with LFD STAND SAM-STN-WM55R, • LFD TRAY SAM-CY-TF65BBC , • LFD FLIP PEN SAM-CY-PENR			
C.3.2	PC • Intel® Core™ i7 14700 (20 cores, up to 5.4 GHz Turbo, 65 W) • Windows 11 Pro, English • Intel Integrated Graphics • 32GB: 2 x 16 GB, DDR5, 4400 MT/s, non-ECC • 1 TB, M.2 2280, TLC PCIe Gen4 NVMe, SSD, SED Ready • Precision 3680 Tower with 300W (80 Plus Platinum) PSU • Monitor			
C.3.3	Aksesori yang berkaitan (Stand TV, Cable HDMI, Extension Plug)			

BIL.	SPEKIFIKASI	YA	TIDAK	CATATAN
C.3.4	Network Video Recorder 8 TB, (8 Channel DS-7608NI-M2) + 8TB HDD Video and Audio • IP Video Input 8-ch Up to 32 MP resolution *After ultra HD resolution mode is enabled, the NVR supports up to 8-ch 32 MP/24 MP IP video inputs. • Incoming Bandwidth128 Mbps • Outgoing Bandwidth256 Mbps • HDMI Output8K (7680 x 4320)/30Hz, 4K (3840 x 2160)/60Hz, 4K (3840 x 2160)/30Hz, 2K (2560 x 1440)/60Hz, 1920 x 1080/60Hz • VGA Output1920 x 1080/60Hz • Video Output ModeHDMI/VGA independent output • CVBS Output1-ch, BNC (1.0 Vp-p, 75), resolution: PAL: 704 x 576, NTSC: 704 x 480 • Audio Output1-ch, RCA (Linear, 1 K) • Two-Way Audio1-ch, RCA (2.0 Vp-p, 1 K, using the audio input) • Decoding • Decoding FormatH.265+/H.265/H.264+/H.264 • Recording Resolution 32 MP/24 MP/12 MP/8 MP/6 MP/5 MP/4 MP/3 MP/1080p/UXGA/720p/VGA /4CIF/DCIF/ 2CIF/CIF/QCIF *After ultra HD resolution mode is enabled, the NVR supports up to 8-ch 32 MP/24 MP IP video inputs. • Synchronous Playback8-ch • Decoding Capability2-ch@32 MP (30 fps)+2-ch@8MP(30fps)/10-ch@8 MP (30 fps)/20-ch@4 MP (30 fps)/40-ch@1080p (30 fps) • Dual-Stream RecordingSupport • Stream TypeVideo, Video & Audio • Audio CompressionG.711ulaw/G.722/G.726/AAC/MP2L2 • Network • Remote Connection128 • Network ProtocolTCP/IP, DHCP, IPv4, IPv6, DNS, DDNS, NTP, RTSP, SADP, SMTP, SNMP, NFS, iSCSI, ISUP, UPnP, HTTP, HTTPS, ONVIF(Version 2.2), OTAP • Network Interface2, RJ-45 10/100/1000 Mbps self-adaptive Ethernet interface • Camera Access ProtocolONVIF(Version 2.5), RTSP • Auxiliary Interface • SATA2 SATA interfaces • CapacityUp to 16 TB capacity for each disk • Alarm In/Out4/1 • USB InterfaceFront panel: 1 USB 2.0; Rear panel: 1 USB 3.0 • General • Power Supply12 VDC, 3.33 A • Consumption 15 W (without HDD) • Working Temperature-10C to 55C (14F to 131F) • Working Humidity10% to 90% • Dimension (W x D x H)385 x 315 x 52 mm (15.2" x 12.4" x 2.0") • <3 kg (without HDD, 2.2 lb.)			
C.4	RANGKAIAN KOMUNIKASI NETWORK			
C.4.1	a) Sim kad (8 Site * 24 Bulan + 3 Bulan 'fasa development')			
C.4.2	4G modem router Teltonika + external antenna (8 Site) Mobile • Mobile module : 4G LTE Cat 4 up to 150 DL/50 UL Mbps; 3G up to 21 DL/5.76 UL Mbps; 2G up to 236.8 DL/236.8 UL kbp • SMS : SMS status, SMS configuration, EMAIL to SMS, SMS to EMAIL, SMS to HTTP, SMS to SMS, scheduled SMS, SMS autoreply, SMPP • APN : Auto APN • Bridge : Direct connection (bridge) between mobile ISP and device on LAN Ethernet • WAN : 1 x WAN port 10/100 Mbps, compliance IEEE 802.3, IEEE 802.3u, 802.3az standards, supports auto MDI/MDIX • LAN : 3 x LAN ports, 10/100 Mbps, compliance IEEE 802.3, IEEE 802.3u standards, supports auto MDI/MDIX Network • Routing : Static routing, Dynamic routing (BGP, OSPF v2, RIP v1/v2, EIGRP, NHRP), Policy based routing • Network protocols : TCP, UDP, IPv4, IPv6, ICMP, NTP, DNS, HTTP, HTTPS, SFTP, FTP, SMTP, SSL/TLS, ARP, VRRP, PPP, PPPoE, UPNP, SSH, DHCP, Telnet, SMPP, SNMP, MQTT, Wake On Lan (WOL), VXLAN Power • Connector : 4-pin industrial DC power socket • Input voltage range : 9 VDC~30 VDC, reverse polarity protection; surge protection >31 VDC 10us max • PoE (passive) : Passive PoE over spare pairs. Possibility to power up through LAN1 port, not compatible with IEEE802.3af, 802.3at and 802.3bt standards, Mode B, 9 - 30 VDC • Power consumption : < 2 W idle, < 7 W Max Physical Interfaces • Ethernet : 4 x RJ45 ports, 10/100 Mbps Operating Environment • Operating temperature : -40 to 75°C • Operating humidity : 10% to 90% non-condensing • Ingress Protection Rating : IP30			
C.4.3	c) Tablet Storage : 256 GB Network : Wireless Only Size : 13 Inch			

BIL.	SPESIFIKASI	YA	TIDAK	CATATAN
D	PERKHIDMATAN PENYELENGGARAAN 24 BULAN DAN PROGRAM LATIHAN KESEDARAN MASYARAKAT BERKENAAN SISTEM PEMANTAUAN AIR MBIP			
D.1	PENYELENGGARAAN PENCEGAHAN DAN PEMBAIKAN • Penyelenggaraan Pencegahan (Preventive Maintenance) • Sensor Paras Air (Water Level) - Pemeriksaan fizikal, pembersihan muka sensor, semakan komunikasi, penentukuran semula, kemas kini firmware, penggantian bateri, solar controller, dan laporan prestasi.			
D.1.1	Sensor Hujan (Rain Sensor) • Pembersihan/semakan permukaan sensor, semakan mekanisme sensor, semakan sambungan data ke papan pemuka.			
D.1.2	Sensor Kualiti Udara (Air Quality) • Semakan housing dan penapis, penentukuran gas, penggantian gas cell, ujian fungsi amaran bau, semakan sambungan rangkaian, kemas kini firmware.			
D.1.3	Sensor Kualiti Air (Water Quality) • Pembersihan probe, penentukuran parameter (DO, pH, BOD, COD, NH4, TSS), semakan kabel, validasi data dengan bacaan manual, lab test, dan laporan servis. Semakan sambungan rangkaian, kemas kini firmware			
D.1.4	Sistem Siren IoT (360°) • Pemeriksaan struktur dan tiang, ujian fungsi manual dan automatik, semakan bateri sandaran, kemas kini firmware, dan log penyelenggaraan.			
D.1.5	Sistem CCTV • Pemeriksaan kamera dan DVR/NVR, pembersihan lensa, semakan sambungan rangkaian, kemas kini firmware, ujian rakaman dan playback.			
D.1.6	Lain-lain (Umum) • Pemeriksaan penebat kabel, kekemasan pemasangan, pengujian komunikasi sistem IoT, dan laporan penyelenggaraan lengkap.			
D.2	Penyelenggaraan Pembaikan (Corrective Maintenance)			
D.2.1	Sensor Paras Air (Water Level) • Penggantian sensor atau komponen elektronik yang gagal, pembaikan pendakap, atau konfigurasi semula komunikasi.			
D.2.2	Sensor Hujan (Rain Sensor) • Penggantian mekanisme tipping / corong / PCB rosak, semakan kuasa dan sambungan semula.			
D.2.3	Sensor Kualiti Udara (Air Quality) • Penggantian gas module, penentukuran semula selepas pembaikan, atau reset firmware.			
D.2.4	Sensor Kualiti Air (Water Quality) Gantian tip individu, recalibration selepas baik pulih, dan ujian fungsi.			
D.2.5	Sistem Siren IoT (360°) • Pemeriksaan struktur dan tiang, ujian fungsi manual dan automatik, semakan bateri sandaran, kemas kini firmware, dan log penyelenggaraan. • Baik pulih unit siren, penggantian speaker, modul kawalan, atau bateri sandaran rosak.			
D.2.6	Sistem CCTV • Gantian kamera / komponen rosak, sambungan semula ke rangkaian, atau konfigurasi IP semula.			
D.2.7	Lain-lain (Umum) • Apa-apa pembaikan lain yang diperlukan untuk memastikan sistem beroperasi sepenuhnya.			
D.3	Sistem dan Mobile App Penyelenggaraan sistem dan mobile app dalam tempoh dua belas (12) bulan, meliputi: • Semakan status server, database dan sambungan API • Kemas kini versi sistem dan mobile app, plugin dan dependencies bagi memastikan prestasi optimum • Pelaksanaan backup pangkalan data dan konfigurasi sistem			
D.4	LATIHAN DAN PEMINDAHAN PENGETAHUAN / TEKNOLOGI (TOT)			
D.4.1	Khidmat latihan menggunakan dashboard dan mobile app Menjalankan latihan kepada pengguna akhir sistem. seperti keperluan berikut: • Kekerapan latihan (1 kali) • Bilangan peserta (20 peserta) • Tempoh latihan 2 hari • Kos tempat latihan, makan, minum akan ditanggung oleh petender			

BIL.	SPESIFIKASI	YA	TIDAK	CATATAN
D.4.2	Montaj pelancaran termasuk apa-apa hebahan seperti : - Gimik pelancaran - Video promosi			

BIL.	SPESIFIKASI	YA	TIDAK	CATATAN
E	PERUNTUKAN SEMENTARA KERJA-KERJA PENAMBAHBAIKAN - INFRASTUKTUR RANGKAIAN DAN KERJA-KERJA AWAM			