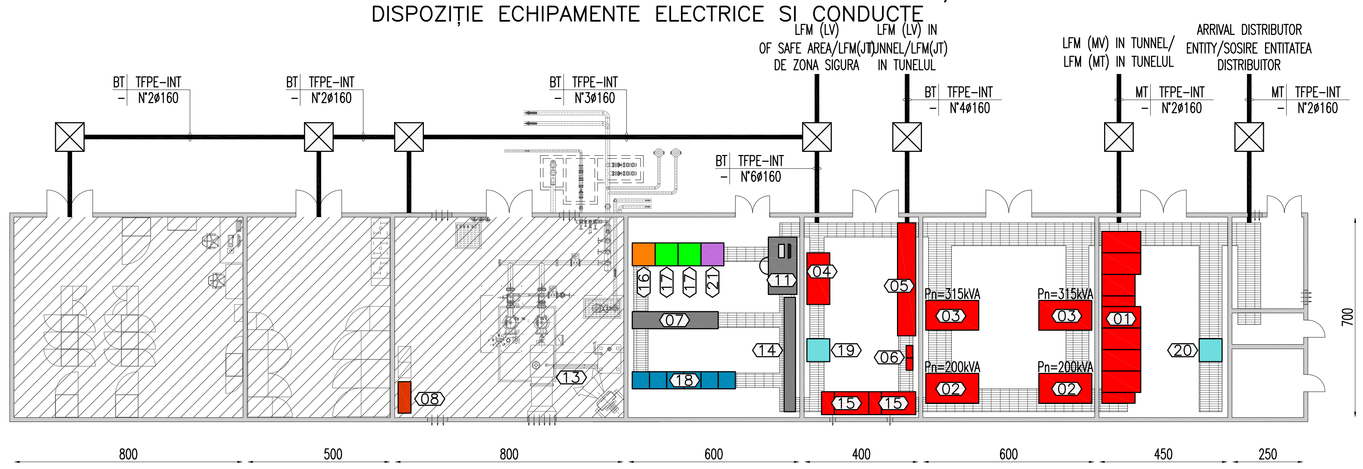
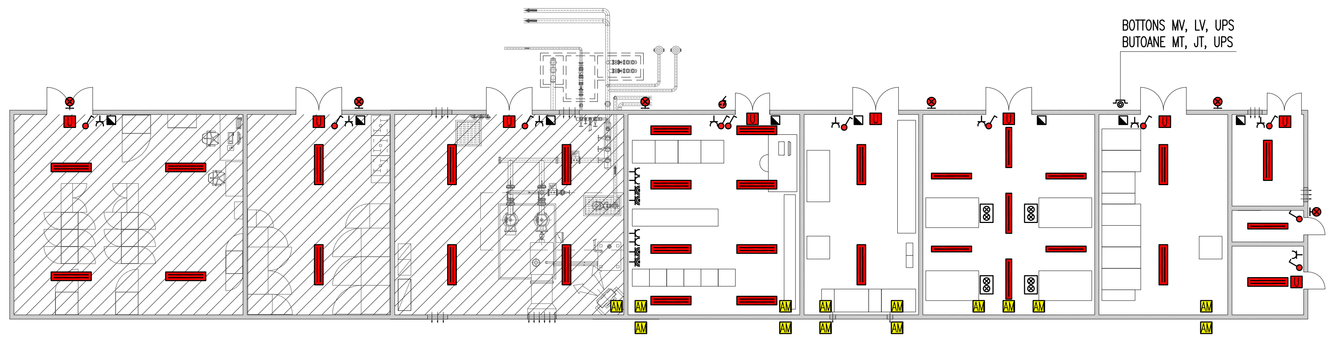
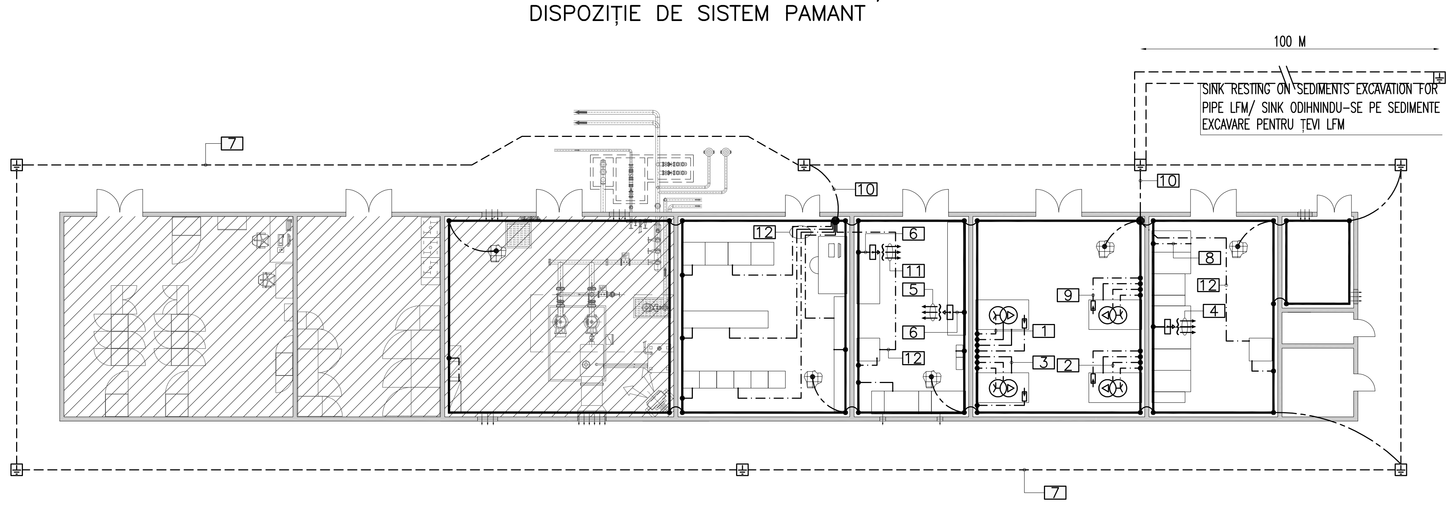
## DISPOSAL OF ELECTRICAL EQUIPMENTS AND DUCTWORK/
## DISPOZIȚIE ECHIPAMENTE ELECTRICE SI CONDUCTE



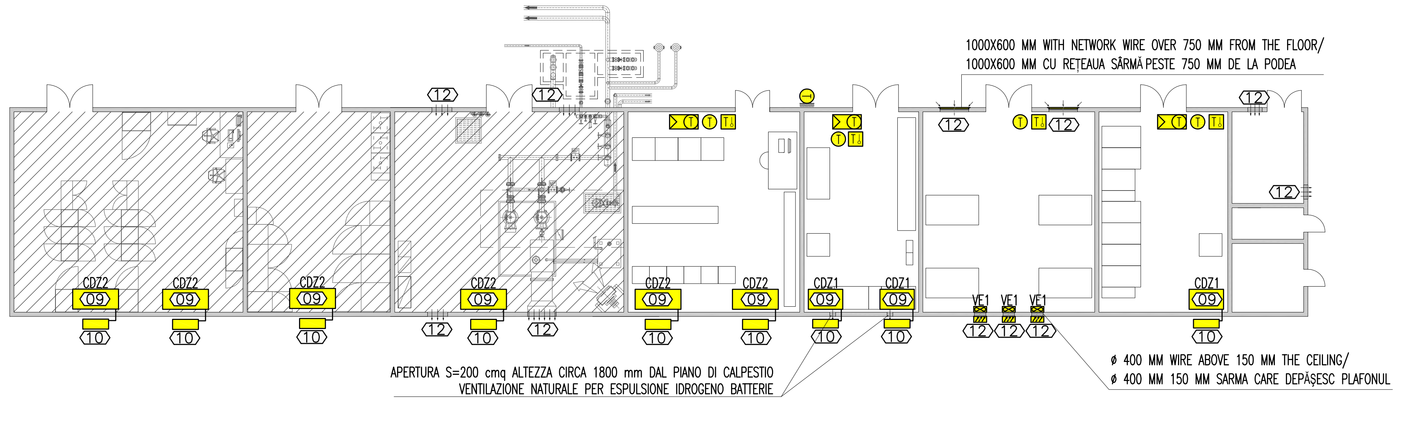

## DISPOSAL OF LIGHTING DRIVING FORCE SYSTEMS/
## DISPOZIȚIE DE SISTEMUL DE LUMINA FORTA MOTRICE



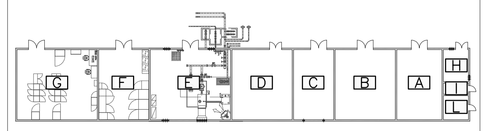

## DISPOSAL OF GROUNDING SYSTEM/
## DISPOZIȚIE DE SISTEM PAMANT




## DISPOSAL OF CONDITIONING AND VENTILATION SYSTEMS/
## DISPOZIȚIE DE SISTEMUL DE CONDITIONARE SI VENTILATIE




## CABIN LOCAL LEGEND/LEGENDA LOCAL CABINA




| | |
|---|---|
| A | MV LOCAL/LOCAL MT |
| B | TRANSFORMERS LOCAL/LOCAL TRANSFORMATOARE |
| C | LV LOCAL/LOCAL JT |
| D | TELECOMMUNICATIONS LOCAL/LOCAL TELECOMUNICAȚII |
| E | PREVENTION FIRE LOCAL/LOCAL LA FOC |
| F | CONTROL EQUIPMENTS LOCAL/LOCALE DE CONTROL ECHIPAMENTE |
| G | EQUIPMENTS LOCAL/LOCAL ECHIPAMENTE |
| H | PROVIDER ENTITY LOCAL/LOCALE ENTITATEA FORNITOR |
| | MEASURES LOCAL/LOCALE MĂSURI |
| L | WAREHOUSE LOCAL/LOCAL DEPOZIT |

## indicator cable ducts/cablu indicator

A B-C
D E

A – LEGEND NETWORKS / LEGENDA REȚELE

| | |
|---|---|
| MT | MEDIUM TENSION / MEDIE TENSIUNE |
| BT | LOW TENSION / JOASĂ TENSIUNE |
| IE | OUTDOOR LIGHTING / ILUMINAT EXTERIOR |
| IL | TUNNEL LIGHTING / ILUMINAT TUNELURI |
| TT | TELECOMMUNICATIONS SYSTEMS / SISTEME DE TELECOMUNICAȚII |
| R | RESERVE / REZERVĂ |

B – LEGEND TYPE / CHEIE DE TIP

| | |
|---|---|
| TFPE | FLEXIBLE TUBE POLYETHYLENE / FURTUN POLIETILENA |
| CAP | FULL STAINLESS STEEL CHANNEL WITH COVER / CANAL FULL INOX CU INTENTIE |
| CAF | EMPTY STAINLESS STEEL CHANNEL WITH COVER / CANAL GOL INOX CU INTENTIE |
| CAZSP | FULL CHANNEL STEEL GALVANIZED SENDZMIR WITH COVER / OTEL U FULL ZINCATE SENDZMIR CU INTENTIE |
| CAZSF | HOLE CHANNEL GALVANIZED SENDZMIR / HOLE CHANNEL ZINCATE SENDZMIR |
| TAI | STAINLESS STEEL TUBE / TUB INOX |

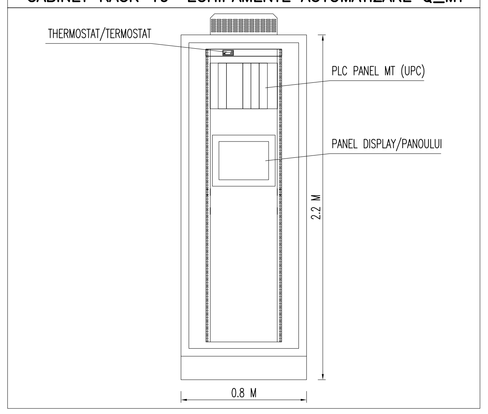
C – LEGEND PLACEMENT / CHEIE DE INSTALARE

| | |
|---|---|
| INT | UNDERGROUND / SUBTERANE |
| SPS | MOUNT VIEW / MOUNT VEDEREA |
| CUN | WITHIN BURROWS OR UNDER TECHNICIAN FLOOR / IN CADRUL BURROWS TEHNICIAN PODEA SAU SUB |

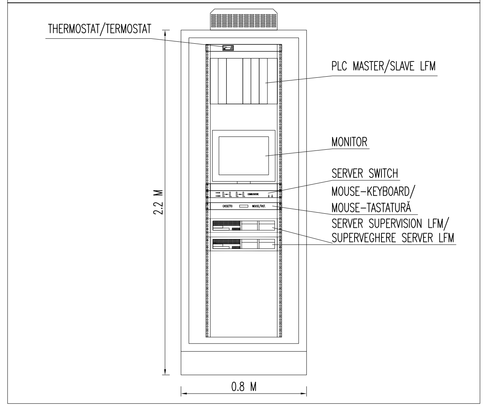
D – SEPTA NUMEBER / NUMĂRUL SEPTURI

E – NUMBERS AND DIMENSIONS (mm) / NUMĂRUL DIMENSIUNI (mm)

## CABINET RACK 19" AUTOMATION EQUIPMENT Q_MT
## CABINET RACK 19" ECHIPAMENTE AUTOMATIZARE Q_MT




## CABINET RACK 19" WITH FRONT-END EQUIPMENT LFM
## CABINET RACK 19" CU ECHIPAMENT FRONT-END LFM




## LEGENDA SIMBOLI
## IMPIANTO DI TERRA

| | |
|---|---|
| | SECONDARY NODE OF GROUND-INTERMEDIATE/NOD SECUNDAR DE PAMANTULUI-INTERMEDIAR |
| | ELECTROWELDED NETWORK DROWNING IN FLOOR/REȚEA ELECTROSUDATE ÎNEC ÎN PODEA |
| | COCKPIT OF GROUND 600X600 MM INSPECT, COMPLETE Puntazza W = 2000 MM AND MANHOLE DRIVE-OVER<br>CARLINGA MM 600X600 LAND INSPECT, COMPLET PUNTAZZA W = 2000 MM SI CAMINE DRIVE-OVER |
| • | CONNECTION WITH BRASS TERMINAL BETWEEN THE EQUIPOTENTIAL RING AND NETWORK ELECTROWELEDE-SINK/CONEXIUNEA CU TERMINALUL ALAMA DINTRE RING EGALIZARE SI REȚEAUA ELECTROSUDATE-SINK |
| · | GROUND CONNECTION EQUIPMENT/CONEXIUNE IMPAMANTAREA ECHIPAMENTE |
| | EQUIPOTENTIAL RING FOR MASSES AND EXTRANEOUS MASSES OF CABIN IN BARE COPPER FLAT 60X5 MM MOUNTED WALL ON INSULATION SUPPORT/<br>RING EGALIZARE PENTRU MASE ȘI MASE AFARA DE CABINĂ ÎN PLATĂ CUPRU BARE 60X5 MM MONTAT PEREȚI PE SUPORT IZOLAȚIE |
| | CONDUCTOR PROTECTION-MAIN LINK EQUIPOTENTIAL/PROTECȚIA CONDUCTORULUI-LINK-UL PRINCIPAL ECHIPOTENTIALĂ |
| | GROUND CONDUCTOR/CONDUCTORULUI SOL |
| | BURIED SINK 0.5M IN ROPE BARE COPPER S = 35MMQ<br>CHIUVETA ÎNGROPAT ÎNTR-O 0,5 M CUPRU ROPE BARE S = 35MMQ |

## EQUIPMENTS LEGEND/LEGENDA ECHIPAMENTE

| | |
|---|---|
| 01 | MEDIUM VOLTAGE/MEDIA TENSIUNE Q_MT |
| 02 | TRANSFORMER MT/BT 20kV/1kV |
| 03 | TRANSFORMER MT/BT 20kV/0.4kV |
| 04 | SAFE AREA PANEL/CADRU DE ZONA SIGURA (QdP) |
| 05 | LOW VOLTAGE PANEL/CADRU DE JOASA TENSIUNE (Q_BT) |
| 06 | POWER FACTOR CORRECTION/CADRU DE FACTOR Q_RIF |
| 07 | CABINET FOR SYSTEM GSM-R, SDH, SPVI, |
| 08 | FIRE PUMPS PANEL/CADRU POMPELE DE INCENDIU(Q_AI) |
| 09 | INDOOR UNIT OF AIR CONDITIONING CEILING/UNITATEA INTERIOARĂ DIN PLAFONUL CLIMATIZARE |
| 10 | OUTER UNIT OF AIR CONDITIONING/UNITATEA EXTERIOARĂ DE CLIMATIZARE |
| 11 | OPERATOR'S STATION/STATIE DE OPERATORUL |
| 12 | OPENING FOR VENTILATION/DESCHIDERE PENTRU VENTILATIE |
| 13 | ELECTRIC HEATER FAN/FAN TERMO-ELECTRICE |
| 14 | EQUIPAMENTS STSI AND CABLE CABINET/ECHIPAMENTE STSI SI CABINET CABLU |
| 15 | UPS |
| 16 | CABINET RACK 19" EQUIPMENTS IPBX EMERGENCY TELEPHONE AND SOUND DIFFUSION/CABINET RACK 19" ECHIPAMENTE IPBX TELEFON DE URGENTA SI DIFUZARE DE SUNET |
| 17 | CABINET RACK 19" OPTICAL CONVERTER-COPPER AND DATA NETWORK EQUIPMENTS/CABINET RACK 19" CONVERTOR OPTICE-CUPRU SI ECHIPAMENTE RETEA DATA |
| 18 | CABINET RACK 19" WITH RADIO UMTS/GSM EQUIPMENTS<br>CABINET RACK 19" CU RADIO UMTS/GSM ECHIPAMENTE |
| 19 | CABINET RACK 19" WITH FRONT-END LFM EQUIPMENTS<br>CABINET RACK 19" CU ECHIPAMENTE FRONT-END LFM |
| 20 | CABINET RACK 19" WITH AUTOMATION EQUIPMENTS Q_MT<br>CABINET RACK 19" CU ECHIPAMENTE AUTOMATIZARE Q_MT |
| 21 | CABINET RACK 19" WITH SECURITY EQUIPMENTS<br>CABINET RACK 19" CU ECHIPAMENTE DE SECURITATE |

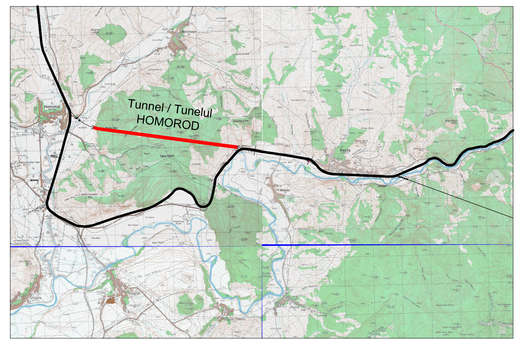
## LEGENDA SIMBOLI
## IMPIANTI LFM IN CABINA

| | |
|---|---|
| | POLE SWITCH/POLE SWITCH |
| | BUTTON TO ACCESS SECURE (WITH SAFETY GLASS)<br>BUTON PENTRU SECURE ACCESS (CU STICLĂ DE SIGURANȚĂ) |
| -c | CIVIL SOCKET 10/16 A WITH PROTECTION LEAD (NETWORK STANDARD)<br>PRIZA CIVILĂ 10/16 CU PLUMB DE PROTECȚIE (STANDARD DE REȚEA) |
| -it | CIVIL SOCKET P30 UNIVERSAL 16 A WITH PROTECTION CONDUCTOR (CONTINUITY NETWORK "ABSOLUTE)<br>PRIZA P30 CIVILE UNIVERSALE 16 A CU CONDUCTOR DE PROTECȚIE (CONTINUITATE REȚEA "ABSOLUTE) |
| | DRIVING FORCE SOCKETS PANEL/CADRU PRIZE DE FORTA MOTRICE<br>(N°1 3P+N+T 16 A + N°1 1P+N+T 16 A) |
| | ILLUMINATING DEVICE WITH LINEAR FLUORESCENT LAMPS FOR MOUNTING SURFACE- 1x36 W<br>DISPOZITIV DE ILUMINAT CU LĂMPI FLUORESCENTE LINIARE PENTRU SUPRAFATA DE MONTAJ- 1x36 W |
| | ILLUMINATING DEVICE WITH LINEAR FLUORESCENT LAMPS FOR MOUNTING SURFACE- 2x36 W<br>DISPOZITIV DE ILUMINAT CU LĂMPI FLUORESCENTE LINIARE PENTRU SUPRAFATA DE MONTAJ- 2x36 W |
| | ILLUMINATING DEVICE WITH COMPACT FLUORESCENT LINEAR WALL MOUNT-1x18 W<br>DISPOZITIV DE ILUMINARE CU FLUORESCENTE COMPACTE LINEAR MONTARE DE PERETE-1x18 W |
| | APPARATUS SINGLE FOR SIGNAL OUTPUT OF SAFETY WITH PICTOGRAM/<br>APARAT SINGLE PENTRU SEMNALUL DE IEȘIRE AL SIGURANȚĂ CU PICTOGRAME |
| | STATE SIGNAL OF TRANSFORMER/SEMNAL STAT DE PROCESOR |
| | TWILIGHT |
| | WELL WITH MANHOLE IN CLS 1000x1000 MM/BINE CU MANHOLE IN CLS 1000x1000 MM |
| | POINT POWER PLANT MECHANICAL UTILITIES (VENTILATION, AIR CONDITIONING, HEATERS) |
| | GRID TO RECOVERY WING INCLINED TO VERTICAL INSTALLATION/<br>GRILA DE RECUPERARE UNGHIULUI ARIPI INSTALAREA VERTICALĂ |
| | AIR EXTRACTOR/EXTRACTOR DE AER |
| | TEMPERATURE PROBE/SONDA DE TEMPERATURA |
| | EXTERNAL TEMPERATURE PROBE/SONDA DE TEMPERATURA EXTERNE |
| | THERMOSTAT/TERMOSTAT |
| | CONDITIONER REGULATOR WITH INCORPORATED PROBE/<br>REGULATOR CONDITIONER CU PROBE INCORPORATE |
| | PRESSURIZED DAMPER/AMORTIZOR PRESURIZATE |

## INDICATORS LEGEND TO GROUND CONNECTIONS/
## LEGENDA INDICATORII AI CONEXIUNI SOL

| | |
|---|---|
| 1 | GROUND CONNECTION OF NEUTRAL (CENTER TRANSFORMERS STAR) WITH CABLE YELLOW-GREEN N07G9-K D = 35 MMQ/<br>CONEXIUNE SOL NEUTRE (CENTER TRANSFORMATOARE STEA) CU CABLE GALBEN-VERDE N07G9-K D = 35 MMQ |
| 2 | GROUND CONNECTION OF THE CARCASS OF TRANSFORMER CABLE YELLOW-GREEN N07G9-K S = 35 MMQ/CONEXIUNE SOL CARCASĂ A TRANSFORMATOR CABLE GALBEN-VERDE N07G9-K S = 35 MMQ |
| 3 | GROUND CONNECTION OF THE BOX OR GRID TRANSFORMER PROTECTION WITH CABLE YELLOW-GREEN N07G9-K D = 35 MMQ/CONEXIUNE SOL BOX SAU GRILA PROTECTIE TRANSFORMATOR CU CABLE GALBEN-VERDE N07G9-K D = 35 MMQ |
| 4 | GROUND CONNECTION OF SCREEN CABLE MV CABLE YELLOW-GREEN N07G9-K S = 35 MMQ/CONEXIUNE SOL DE ECRAN CABLU MT CABLU galben-verde N07G9-K S = 35 MMQ |
| 5 | PROTECTION CONDUCTORS FOR USERS PANEL POWERED BY LV<br>CONDUCTORI DE PROTECTIE PENTRU UTILIZATORII CADRU ALIMENTATE JT |
| 6 | GROUND CONNECTION OF BAR-COLLECTOR OF LV PANEL/<br>CONEXIUNE SOL PANOU DE BARA-CULEGATOR DE JT CADRU |
| 7 | GROUND SINK/SINK SOL |
| 8 | GROUND CONNECTION OF CARCASS OF MV PANEL CABLE YELLOW-GREEN N07G9-K S=35 MMQ/CONEXIUNE SOL DE LOCUINTE DE CADRU MT CABLU GALBEN-VERDE N07G9-K S = 35 MMQ |
| 9 | GROUND CONNECTION OF THE OVERVOLTAGE PROTECTORS WITH CABLE 35 MMQ = KS-N07G9/CONEXIUNE SOL DE DESCARCATOARE SUPRATENSIUNE CU CABLU N07G9-K S = 35 MMQ |
| 10 | GROUND CONDUCTOR TO MAIN MANIFOLD WITH CABLE/CONDUCTORULUI SOL LA COLECTORUL DE PRINCIPAL CU CABLU N07G9-GALBEN-VERDE K D=35MMQ N07G9-YELLOW-GREEN K D=35 MMQ |
| 11 | PROTECTION CONDUCTOR TO PANELS BT OF LFM UTILITIES IN TUNNEL/<br>CONDUCTORI DE PROTECTIE CADRU JT DE UTILITĂȚI LFM IN TUNELUL |
| 12 | GROUND CONNECTION TO ELECTRONIC DEVICES WITH CABLE N07G9 MMQ-S = 10 K (PER IEC 64/8-707)/CONEXIUNE SOL DISPOZITIVELOR ELECTRONICE, CU CABLU N07G9 MMQ-S = 10 K (DE IEC 64/8-707) |

## GENERAL PLAN / PLANUL GENERAL




## COLORS LEGEND/COLOR CHEIE

| | |
|---|---|
| | LIGHT DRIVING FORSE SYSTEM/SISTEMUL DE LUMINA FORTA MOTRICE(LFM) |
| | SUPERVISION SYSTEM/SISTEMUL DE SUPERVEGHERE (LFM) |
| | EMERGENCY TELEPHONE AND SOUN DIFFUSION SYSTEM/SISTEME DE TELEFON DE URGENTA SI DUFUZARE DE SUNET (TEM_DS) |
| | INTRUSION, ACCESS CONTROL AND VIDEO SURVEILLANCE SYSTEMS/<br>SISTEMUL DE EFRACTIE, CONTROL ACCES SI SUPERVEGHERE |
| | FIRE DETECTION SYSTEM/SISTEMUL DE DETECTIE INCENDIU |
| | GSM/UMTS RADIO SYSTEM/SISTEMUL DE RADIO GSM/UMTS |
| | FIRE PROTECTION SYSTEM/SISTEMUL DE INCENDIU |
| | VENTILATION SYSTEM/SISTEMUL DE VENTILATIE |
| | EMERGENCY DATA NETWORK SYSTEM/SISTEMUL DE RETEA DE DATE DE URGENTA |

NOTES:
- PARTITIONS REI120
- LOCAL HIGH NET H = 3 M
- THE LINKS BETWEEN THE VARIOUS CABIN EQUIPMENT WILL BE REALIZED THROUGH FLOOR BURROWS RUN AT 200 MM FROM THE WALLS AND COVERED WITH CHECKERED PLATE 8 MM THICK
- IN THE WALLS CROSSINGS,THE FEATURE REI 120 WILL BE GUARANTEED BY FIRE BARRIERS
- ALL BURROWS HAVE A DEPTH OF 800 MM ABOVE THE FLOOR
- CONDUCTORS FOR ELECTRICAL SYSTEMS OF DIFFERENT CATEGORY (MT, BT, SP), INSIDE OF THE BURROWS, WILL BE NECESSARY SEGREGATED BY SEPARATORS

NOTE:
- PEREȚI DESPARTITORI REI120
- LOCAL HIGH NET H = 3 M
- LEGĂTURI ÎNTRE DIVERSE ECHIPAMENTE SE VA FACE PRIN PODEA MĂNĂ BURROWS PORNEȘTE DE LA 200 MM DE PE PEREȚI ȘI ACOPERITE CU PLACĂ DE 8 MM GROSIME ÎN CAROURI
- PUNCTELOR DE TRECERE A PEREȚILOR 120 VA BENEFICIA DE "REI SĂ FIE GARANTATĂ DE BARIERELE FOC
- TOATE SĂ AIBĂ O ADÂNCIME BURROWS "DE 800 MM DEASUPRA PODELEI
- CONDUCTORI DE SISTEME ELECTRICE DIN CATEGORIA DIFERITE (MT, BT, SP), ÎN INTERIORUL VIZUINI, VA FI NECESARĂ SEPARATOARE SEGREGATE

| Indice Index | Data Date | Modificare Modification/Revision | Proiectant Designer | Aprobat Consultant Approved Consultant | Aprobat CFR Approved CFR |
|---|---|---|---|---|---|
| D | | | | | |
| C | | | | | |
| B | | | | | |
| A | | | | | |

GUVERNUL ROMANIEI ROMANIAN GOVERNMENT

PROIECT FINANȚAT DE UNIUNEA EUROPEANĂ EUROPEAN UNION FINANCED PROJECT

C.N.C.F. "C.F.R." - S.A.

**CLIENT / CLIENT**

ITALFERR GRUPPO FERROVIE DELLO STATO Joint Venture leader — Scott Wilson — OBERMEYER PLANEN + BERATEN GmbH — TECNIC Consulting Engineers

**CONSULTANT / CONSULTANT**

| | | | Data Date | Semnătură Signature |
|---|---|---|---|---|
| Aprobat Approved | Șef proiect Project manager | R. Liuzza | | |
| Aprobat Approved | Coordonator Secțiune 1 Section 1 Coordinator | C. Gambelli | | |
| Verificat Checked | Tunel Expert Tunnel Expert | C. Gambelli | | |
| Întocmit Elaborated | Proiectant Designer | P. Amodio | | |

**SUBCONSULTANT / SUBCONSULTANT**

| | | | | |
|---|---|---|---|---|
| Aprobat Approved | Responsabil Subconsultant Subconsultant Responsible | | | |
| Întocmit Elaborated | Proiectant Designer | | | |

Reabilitarea liniei de cale ferata Brașov - Simeria, parte componentă a coridorului IV Pan European, pentru circulația trenurilor cu viteza maximă de 160 km/h. Secțiune 1 Brasov - Sighisoara

Rehabilitation of the railway line Brașov - Simeria, component Part of the IV Pan-European Corridor, for the trains circulation with maximum speed of 160 km/h. Section 1 Brasov - Sighisoara

*Proiect/Project* 2004/RO/16/P/PA/003

Faza / Phase: P.Th. / T.D.

Denumire desen / Drawing Title : **TUNNEL/TUNELUL HOMOROD**

RACOS SIDE/INSPRE RACOS

**Safety Tunnel Power Supply system /Sistem de alimentare de siguranță a tunelul**
**Local technological Layout LFM system/Plan de situatie tehnologice Sistem Lfm**

| Codificare / Codification System | | | | | | | | | | | | | | | | Scara / Scale - | LOT | Nr. / No |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | A | 5 | 1 | 0 | 1 | C | 1 | 2 | L | X | T | S | 2 | 0 | 7 | 6 | 0 | 0 5 | 0 |