
OPERATION & MAINTENANCE OF THE LEBANESE UNIVERSITY CAMPUS - HADATH



VOLUME 2: TECHNICAL DOCUMENTS

Section 2.7 – Work Package 6 – External Works

Lebanese University Campus - Hadath

Work Parcel 6: External Works

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6.1 - Work Parcel 6: General Description of the Work Parcel

LAND SURFACE AREA :	705000 m ²
Main Spaces: Circulation areas Landscape areas Sports Fields	Roads and Open air Parkings Walkways Landscape and Green Areas Open air Amphitheaters Botanical Garden Sports Fields
Generality	The Lebanese University Campus occupies in the Hadath region an area of approximately 705,000 m ² (including the land located between Al Ghadir River and the southern concrete boundary fence), it consists of 10 built Faculties and various other annexes services buildings over 30% of the site area. The external area approximately 600,000 m ² consists of Landscaped and green areas (approx. 330,000 m ²), Roads and open air parkings (approx. 100,000 m ²), Piazzas and Walkways (approx. 120,000 m ²), Open air theaters, and Sports Fields (approx. 50,000 m ²). All Service Utilities Networks (Water supply, Waste water, Storm water, High voltage, Low voltage, etc), are running in this area named "External Works", including the underground Utility Tunnel. This area is divided in 17 zones (as mentioned on the attached master plan in appendix). The Campus can be accessed via two entrances one at the East from old Saida road, and another at the West from Leilaki area.
Roads and Open air Parkings	Ring and services roads, occupying approximately 58,000 m ² (Roads 6,7 Km, Side-walks 15,700 m ²) composed of asphaltic runways, paved sidewalks, Bike lanes and side planters. These roads are serving all built Faculties and annexe services buildings. Open air Parkings, are occupying an area of approximately 43,000 m ² , and of a capacity of 3,000 cars and buses.
Walkways	Paved walkways areas crossing the Landscape and the Green areas serving all Faculties and annexe services buildings.
Landscape and Green areas and Botanical Garden	These areas occupy approximately 330,000 m ² , composed of plantation (Trees, Shrubs, Ground cover and Lawn), which can foster an ideal Environment The Campus includes also a Botanical Garden occupying an area of approximately 16,000 m ² .
Open air Amphitheaters	These theaters are serving for different activities (Ceremonies, acts, etc), for a capacity of 1,500 viewers.
Sports Fields	Sports Fields occupy an area of approximately 50,000 m ² , and consist of a Football stadium (2,500 viewers), multi-purpose stadium (1,200 viewers), eight Tennis courts, six Basketball courts, one multi-purpose court, one Olympic Swimming pool and one Diving pool.
Networks (Sewage & Storm water) (Electrical)	Among the service utilities networks, sewage and storm water networks consist of 30,000 Lm of concrete and P.V.C pipes, and Precast concrete manholes. These networks are serving the different buildings and external areas. The project's sewer lines are discharging in the public network located at the West side of the project, furthermore, the Storm water lines are discharging in the collection underground reservoir (BUFFER), and then pumped to the public network. Part of the Electrical network (Low voltage, Control cables, Lighting network, Earthing, etc), is running (buried in soil or inside duct-banks) under the site project
Utility Tunnel	Utility Tunnel consist of 1,800 Lm running under the site project and serving all Faculties starting from the Technical area. Most of the project's main networks are running inside this tunnel (Water supply, Chilled water, Fire fighting, etc)
Steel Hangar	This hangar was originally built for the Lebanese Army and could be used for sports activities. Hangar area is 30m x 12m = 360m ² , 4-5m high, in addition to two fabricated WCs with six washrooms and six shower trays.
Prefabricated Cabinet	Ten prefabricated cabinets were constructed in order to house Internal Security officers, and army officers, each cabinet measures 9.3m x 3.3m, it includes washrooms and shower trays.

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6.2.1 - Work Parcel 6 - Roads, Open air Parkings and External Signs

2.1.1 - Technical Description

Family	Item Description	Summary	Trade	Qty	Unit
Roads	Asphalt pavement	Binder coarse 5 cm, 2 Wearing coarses 4 cm	A03	58,800	m ²
	Raised, Flush & Cut kerb stone	Precast concrete Kerbs, 15 x 30 cm & 15 x 20 cm	A03	34,000	Lm
	Road marking	Quick drying paint Alkaline resistant	A08/ E12	40,000	Lm
Side walks	Precast concrete tiles	Precast concrete tiles 40 x 40 cm (grey color)	A08	17,000	m ²
	Concrete borders	Cast in situ concrete borders types A & A-a 30 x 15 cm	A08	8,000	Lm
	Stamped concrete	Cast in situ resin reinforced concrete for bike lanes	A08	12,000	m ²
Open air Parkings	Asphalt pavement	Binder coarse 5 cm, 2 Wearing coarses 4 cm	A03	43,000	m ²
Road & Parking Signs	Totem		A11	4	Nr
	directional Signs		A11	30	Nr
	Panel		A11	25	Nr
	Panel variant		A11	25	Nr
Pedestrian Signs	All Type of signs		A11	240	Nr

2.1.2 - Technical Scope Of Work : Roads and Open air Parkings

- To comply with the requirements of the Contract Documents.
- To submit the document describing the procedure of maintenance for approval.
- To maintain and keep the roads (asphalt, curbstones, dish channels, road markings, etc...) in good condition and safe, so as to avoid damage, discomfort to users, and to avoid unsightly appearance of the roads/parkings.
- To provide sufficient personnel and equipment.
- To perform all necessary works in a professional and workmanlike manner.
- To provide regular report (twice per year), showing the maintenance works performed, and contain the suggestions for future maintenance tasks.

Maintenance

1- Preventive maintenance

- Ditches, structures, basins and any concrete work should be clean and not damaged.
- Roads should be protected against erosion during the wet season.
- To respond in a short time and correct any road problem (potholes, depression, disaggregation, corrugation, cracking, bleeding, dislocation of curbstones, etc...) and to prevent further damages to roads and adjacent structures.
- The ring roads and the service roads should be clean and free from landslides, debris, branches, to prevent any obstruction or disruption to pedestrians or traffic.

2- Regular maintenance

- All roads and service roads to be checked and repaired from any of the following problems:
 - * Potholes
 - * Depression
 - * Disaggregation (loss of surface aggregate due to wear by traffic).
 - * Corrugation (more or less regular succession of transverse depressions and protuberances).
 - * Cracking (the occurrence of interconnected cracks in the surface of wearing course).
 - * Bleeding
 - * All curbstones, gutters and dish channels to be repaired or replaced if damaged, dislocated, or settled.
- * The drainage system should be maintained (cleaned, flushed and repaired) regularly.
- * Road and Parkings marking should be visible, clean and fully periodically restored.
- * The contractor shall perform unplanned works upon the Client's request.
- * The contractor shall manage the traffic during the course of any work.
- * The contractor shall ensure general communication with customers, road users and the public authorities.

3- Emergency maintenance

- The contractor shall remove fallen trees and landslide debris from roads immediately.
- The contractor shall professionally manage emergency situations, incidents and accidents, include the removal of snow from roads and pavements in case of snow fall.
- The contractor shall repair all damages due to traffic accidents immediately.
- The contractor shall prepare and execute safety plan.
- The contractor should use temporary signs after covering existing road markings temporarily. The temporary signs may not remain for longer than 7 days.

2.1.3 - Technical Scope Of Work : External Signs and Boards

- * To comply with the requirements of the Contract Documents.
- * The Contractor shall provide the procedure maintenance related to External Signs and Boards for approval.
- * To make sure that all signs (Road & Parking Signs Outboards and Pedestrian signs outboards) remain in good shape, good color, clear, undamaged.
- * To repair, replace and remove any damaged sign.
- * To respond quickly to any emergency situation.
- * To provide sufficient personnel and equipment.

1 - Regular Maintenance

The Contractor shall regularly and when required replace and repair any damaged sign. The repair or replacement of damaged sign shall include concrete footings, posts, mounting brackets, locking screws, lifting keys, protective sheeting, painting and all necessary works and accessories.

All Signs shall be cleaned regularly and when required.

2 - Emergency

If any sign is damaged by a human or a vehicle an immediate action shall be taken to remove, replace or repair the damage, not later than one week.

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6.2.2 - Work Parcel 6 - Sewage and Storm Water Networks

2.2.1 - Technical Description

Family	Item Description	Summary	Trade	Qty	Unit
Sewage Network	Sewage Network Lines	Concrete & PVC pipes, Diameter varies	A07	8,017	Lm
	Sewage Network Manholes	Precast concrete Manholes	A07	330	Nr
	Sewage Manholes (Covers + Frame)	Cast iron covers with frames	A07	330	Nr
	Sewage Manholes (ladder steps)	Galvanized steps inside MH.	A07	1,800	Nr
Storm Water/ Drainage Network	Storm water main Line (Box Culvert)	R C, Dim. H=100 cm, W=120 to 200 cm	A07	1,245	Lm
	Storm water Network Lines	Concrete & PVC pipes, Diameter varies	A07	22,655	Lm
	Drainage channel	Concrete channel with concrete grating	A07	7,600	Lm
	Drainage channel	Concrete channel with cast iron grating	A07	1,900	Lm
	Perforated drainage pipes	PVC pipes, Diam. 3" and 4"	A07	5,000	Lm
	Storm water Network Manholes	Precast concrete Manholes	A07	560	Nr
	Storm water Gullies	Precast concrete Gully Manholes	A07	750	Nr
	Storm Manholes (Covers + Frame)	Cast iron covers with frames	A07	1,310	Nr
	Storm Manholes (ladder Steps)	Galvanized steps inside MH.	A07	5,000	Nr

2.2.2 - Technical Scope Of Work

- * To comply with the requirements of the Contract Documents.
- * To submit the document describing the procedure of maintenance for approval.
- * To make sure that the waste water lines and manholes are kept clean, undamaged, and in good working conditions as they were designed for.
- * To respond quickly to any emergency situation.
- * To provide sufficient personnel and equipment.
- * To perform all necessary works in a professional and workmanlike manner to the satisfaction of the client.
- * To perform works and services in respect of the environmental requirements.
- * To interact with the corresponding authorities.
- * To provide regular report (twice per year), showing the maintenance works performed, and contain the suggestions for future maintenance tasks.

Maintenance

1- Preventive maintenance

- * The sewer, storm, and gully manholes shall be cleaned thoroughly every six months ensuring no foreign material has entered the sewer facility to prevent any possible clogging of the network, flooding or seepage to adjacent utilities or structures.
- * The sewer, storm, and gully lines shall be cleaned thoroughly and flushed every six months especially before the rainy season.
- * The Contractor shall coordinate with the functioning/operation of the storm water collector reservoir, in order to avoid the flood of the site, especially during the rainy season.
- * Open grated manholes or gullies should be cleaned monthly or as required and protected against eroded or foreign materials entering the system.
- * To respond in a short time to any complaints or request from the Client, to correct the problems, and to prevent further damages to the network and adjacent structures.

2- Regular maintenance

- * The sewer, storm, and gully manholes shall be visually inspected.
- * The sewer, storm, and gully manholes shall be cleaned every six months and or when required.
- * The sewer, storm, and gully lines shall be cleaned and flushed every six months and or when required.
- * All manholes frame and covers shall be checked, adjusted and repaired regularly for any settlements, cracks, damages, or closing mechanism.
- * Make sure that the ladders inside all manholes are firmly embedded in the wall and protected with an epoxy paint.
- * Site must be kept clean and neat at all times from any material or debris caused by the maintenance operations.

3- Emergency maintenance

- * If any of the sewer, storm, or gully lines gets clogged or broken an immediate action must be taken to clean and flush the lines and to correct the problem.
- * In case leaks are detected, the contractor shall afford the cost (materials, equipments and labour) of repairing the pipes and of the necessary works, according to the instructions of the Client.

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6.2.3 - Work Parcel 6 - Pavement and Urban Furniture

2.3.1 - Technical Description

Family	Item Description	Summary	Trade	Qty	Unit
Patios & Piazza	Bush-Hammered Tiles	Agglomerated tiles 29.35 x 29.35 x 5 cm	A08	9,600	m ²
	Local Stone	Rough Surface 30x30	A08	1,070	m ²
	Exposed aggregate tiles	Exposed aggregate 40 x 40 x 3.5 cm	A08	6,260	m ²
	Smooth finish tiles	Smooth finish tiles, sizes varies	A08	97,000	m ²
	Stairs (precast concrete colored)	Steps & Risers tiling	A08	3,000	m ²
	Stairs (Stone tiles)	Steps & Risers stones tiling	A08	500	m ²
	Bike lane paving/Topcrete	Stamped colored concrete with hardeners	A08	12,000	m ²
	Borders Type A (embedded)	Cast in situ reinforced concrete	A08	12,700	Lm
	Borders Type A-a (exposed)	Cast in situ reinforced concrete	A08	3,580	Lm
Fire Truck Roads	Unit pavers	Precast colored concrete blocks 10 x 10 x 20 cm posed on crushed sand bed	A08		m ²
	Concrete borders	Cast in situ concrete borders type A-a, 30 x 15 cm	A08	4,400	Lm
Urban furniture	Pergola's		A10	6	Nr
	Bollards (Fixed)	Cast iron painted, fixed on concrete base	A10	49	Nr
	Bollards (Removable)	Cast iron painted, fixed on concrete base	A10	117	Nr
	Benches	Precast concrete benches	A10	246	Nr
	Fence (precast concrete)	Precast concrete panels with columns	A10	2,200	Lm
	Enclosure Type A	Metal fence	A10	110	Lm
	Enclosure Type B	Metal fence	A10	743	Lm
	Bicycle Racks	Metal racks	A10	38	Nr
	Handrails	Metal painted handrails, different types	A10	1,375	Lm
	Guardrails	Metal painted handrails, different types	A10	441	Lm
	Metal Fence	Galvanized metal painted fence	A10	45	Lm
	Chain Link Fence	Galvanized Metal	A10	600	Lm
Gates	Galvanized metal painted gates	A10	18	Nr	

2.3.2 - Technical Scope Of Work : Pavement

- 1- To comply with the requirements of the Contract Documents.
- 2- Submit the document describing the procedure of maintenance for approval.
- 3- Remove and replace units which are broken, chipped, stained or otherwise damaged. Where directed, remove and replace units which do not match adjoining work. Provide new matching units, install as specified and grout joints to eliminate evidence of replacement. Regrout defective and unsatisfactory joints as required to provide a neat, uniform appearance.
- 4- Remove and replace defected joints (sealed or grouted), according to the code of practice.
- 5- Regular cleaning of different tiles and corresponding joints, using clean water and stiff bristly brushes.
- 6- To provide regular report (yearly), showing the maintenance works performed, and contain the suggestions for future maintenance tasks.

2.3.3 -Technical Scope Of Work : Urban Furniture

The Contractor is responsible to keep in good and practical conditions all the Urban Furniture, includes but is not limited to *bollards, litter bins, concrete bench, seats, bicycle racks, bus shelters, pergola, etc...*

- * Contractor shall comply with requirements of the Contract documents.
- * Contractor shall provide the document related to the procedure of maintenance for approval.
- * Contractor is responsible to perform the preventive (routine) and corrective maintenance (emergency), cleaning and restoration (replace of defected items, painting, welding, corrosion protection).
- * All maintenance works shall be performed in accordance with the manufacturer's recommendations and the code of practice.
- * Contractor shall be responsible to provide regular report (yearly), showing the maintenance works performed, and contain the suggestions for future maintenance tasks.

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6.2.4 - Work Parcel 6 - Planting and Irrigation Network

2.4.1 - Technical Description

Family	Item Description	Summary	Trade	Qty	Unit
Plants	Trees	All Plants are approximately ten years old	A09	7,330	Nr
	Shrubs	All Plants are approximately ten years old	A09	69,979	Nr
	Ground Cover	All Plants are approximately ten years old	A09	240,400	Nr
	Lawn	All Plants are approximately ten years old	A09	15,000	m ²
	Climbing Plants	All Plants are approximately ten years old	A09	82	Nr
	Botanical Garden Trees	All Plants are approximately ten years old	A09	64	Nr
	Botanical Garden Plants	All Plants are approximately ten years old	A09	4,225	Nr
	Tree pits Grating	Cast Iron Size Varies 60cm, 80cm, 100cm, 120cm, 160cm	A09		Nr
Irrigation	Ductile Iron Pipes	Diam. Varies between 100 mm to 300 mm	A64	2,280	Lm
	Main water lines HDPE	Diam. Varies between 25 mm to 110 mm	A64	59,284	Lm
	Secondary water lines LDPE	Diam. Varies between 16 mm to 25 mm	A64	28,130	Lm
	Electric Control Valves (ECV)	Diam. Varies between 1" to 2"	A64	32	Nr
	Quick Coupling Valves (QCV)	3/4" made by Elysee or Hunter or Rainbird	A64	150	Nr
	Automatic irrigation Controller	Varies between 6 to 24 Stations	A64	7	Nr
	Sprinklers & Spray Heads	Made by Elysee or Hunter or Rainbird	A64	2,385	Nr
	Drainage lines	Perforated PVC (4")	A07	6,000	Lm

2.4.2 - Technical Scope Of Work

- 1- To comply with the requirements of the Contract Documents.
- 2- Submit the document describing the procedure of maintenance for approval.
- 3- The purpose of maintaining all plants (trees, shrubs, ground covers, climbing plants, & lawns) is to keep them in healthy thriving condition and to provide sufficient personnel and equipment to perform all necessary works in a professional and workmanlike manner.
- 4- The purpose of maintaining the irrigation system is to keep it running and functioning correctly and to keep it in good condition.
- 5- To provide regular report (yearly), showing the maintenance works performed, and contain the suggestions for future maintenance tasks.

Maintenance

1- Plants Maintenance

1.1- Preventive maintenance

- * All planting beds, landscaped areas, fencing areas, planting basins around trees and soil covered areas shall be free of weeds.
- * Edges of ground cover beds shall be thinned out and tapered away from the edges of footpaths access roads to avoid any conflict with pedestrians or covering other structures.
- * All shrubs and young trees should be pruned as necessary, by thinning and shaping, to maintain a natural and balanced form of development.

1.2- Regular maintenance

- * **Weeding:** All planting beds, landscaped areas, soil covered areas and fencing areas shall be completely weeded once each month thorough weeding operation throughout the site. All planting basins around trees and shrubs shall also be kept weed-free.
- * **Trimming and Thinning:** Edges of ground cover beds shall be thinned out and tapered away from the edges of footpaths/access roads. Shrubs and ground cover plants shall not be trimmed vertically unless directed otherwise by the Client. Ground cover plants shall be thinned out regularly to avoid matting.
- * **Pruning:** Prune all shrubs and young trees as necessary, by thinning and shaping, to maintain a natural and balanced form of development. This will normally be accomplished by doing a minimum amount of thinning and shaping during periods of growth (spring) and more heavy pruning and shaping in winter. Pruning shall be done with clean, sharp tools. Cuts of over 25 mm in diameter shall be painted with tree paint. Paint shall cover all exposed cambium as well as other exposed living tissues. Paint shall be waterproof, adhesive and elastic, antiseptic, free from kerosene, coal tar, creosote, or any other material injurious to the tree. All pruning shall be consistent with good horticultural practice.
- * **Fertiliser Application:** A balanced commercial fertiliser shall be applied to all areas as needed to maintain them in a healthy, thriving condition. Fertiliser will be spread evenly by hand or with a broadcast spreader and will be thoroughly watered in.
- * **Fungicides and Pesticides Applications:** The Contractor shall carry out regular inspections of all planting areas to check for signs of disease or pest attack. He shall be responsible for rectification of the problem and selection and application of suitable fungicides or pesticides.

- * **Maintenance of Stakes, Guys, Ties:** Maintain and replace stakes, guys, and ties as required with equal materials until plants are capable of standing vertical and free and able to resist normal summer high winds and winter storms. Guys and trees are to be checked and loosened periodically as the trees grow to avoid constriction of the limbs and trunks. Stakes and guy wire dead men are to be checked at intervals to ensure that they are firm in the ground. If trees are firm and mature then remove all tree stakes and guys from the site, except for those trees still needing support.
- * **Replacement of Dead or Defective Plant Material:** Any plants which are dead or defective shall be replaced with materials of equivalent variety. These must match as closely as possible the size, type and condition of the adjacent plants so that they blend in with their surrounding when planted. If soil mix settlement occurs, the Contractor shall place additional soil mix to bring soil levels up to specified heights.
- * **Cleaning Planting Areas:** Planting areas and surrounding shall be cleaned from fallen plants leaves, branches, fruits, nuts, and cones, it must be done regularly to avoid damaging other plants, bothering pedestrians, littering the site, and staining the sidewalks.
- * **Lawn Maintenance:** Lawn shall be mowed regularly and when it reaches approximately 5 cm in height and shall be fertilised as required to keep it green and healthy.
- * **Damages to Utilities:** All areas or utilities damaged by tree or shrub planting or replacement operations are to be fully restored to their original conditions.

1.3- Emergency maintenance

If a tree or plant breaks down and falls (caused by manmade or nature) especially in the vicinity of a street, sidewalk, or pathway, it must be cleared and removed within a short time from discovering it.

2- Irrigation System Maintenance

2.1- Preventive maintenance

- * Irrigation lines and equipment must be checked and tested regularly and repaired if required as soon as possible (same day) to avoid any damages to the system, plants, and to adjacent structures or utilities.
- * The quality of water both supplied by temporary means and through the irrigation system shall be tested periodically to avoid any damages to the plants due to polluted or high salt water.

2.2- Regular maintenance

- * Repair and replace any equipment damaged or broken. Keep heads and lines flushed clear.
- * Test the irrigation system (lines and equipment) regularly for any damages or leak and if found to be malfunctioning then repair within 2 hours.
- * Ensure that the supply lines are regularly flushed and kept clear.
- * The Contractor shall be responsible for repair or replacement of any damaged or broken irrigation equipment including automatic irrigation controllers, automatic or manual sprinkler valves, underground piping or any other component of the system including terminal equipment and the pipe risers that connect them to the underground piping.
- * Properly co-ordinate the various time clocks and adjust schedules to provide adequate water to maintain all planted areas in a thriving condition. Watering schedules shall be arranged so as not to interfere with the Client's use of the facility.
- * The quality of water both supplied by temporary means and through the irrigation system shall be tested periodically right through the Maintenance Period. To accomplish this, the Contractor shall arrange the spraying operations at suitable hours of the day or night to keep water temperature within these limits.

2.3- Emergency maintenance

- * In case of malfunction of the system, provide irrigation water from an approved source within 24 hours, meeting the minimum requirements including any associated transport, pumping or storage facilities required.
- * Stop and repair any leakage to the main and secondary irrigation lines (16mm, 25mm, 32mm, 40mm, 50mm, 63mm, 110mm) immediately and as soon as possible.

3- Manpower

There are approximately 7,000 Trees, 70,000 Shrubs, 240,000 Ground Covers, 80 Climbing Plants, 15,000 m² of Lawn, and 90,000 lm of different sizes of irrigation pipes, therefore the Contractor should be aware to the volume of activities and recruit adequate resources to ensure an excellent maintenance of the planting and irrigation networks.

4- Equipment

The Contractor must have all of the necessary machines and equipment to maintain the Planting and Irrigation works in the LUC site, and should be ready to move quickly and deal professionally with any problem or disaster (manmade or nature) arising in this site.

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6.2.5 - Work Parcel 6 - External Concrete Structures

2.5.1 - Technical Description

Family	Item Description	Summary	Trade
Concrete Works	External retaining walls	Reinforced concrete walls	A12
	Rip rap walls	Laid rocks by hand, variable height	A12

2.5.2 - Technical Scope Of Work

- 1- To comply with the requirement of the Contract.
- 2- The Contractor is responsible to perform the preventive (routine) and corrective maintenance (emergency) related to the external concrete and steel structures, and he is responsible to provide the procedure of maintenance concerning the external concrete and steel elements for approval.
- 3- All maintenance works should be performed in accordance with the applicable standards and codes (Repair Guide ACI 546R-96, ACI 311.4R-95, ACI 364.1 R-94, NACE and ASTM).
- 4- In concrete repair, the Contractor is responsible of removal of deteriorated, damaged or defective concrete, preparation of the concrete surface, preparation, repair of the steel reinforcement and materials replacement.
- 5- In steel structures repair, the Contractor is responsible to maintain the steel structures in good and safe conditions (ex. painting to prevent corrosion, removal of corrosion and repainting, etc...)
- 6- The Contractor shall be responsible to provide regular (yearly) report showing the maintenance works executed.

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6.2.6 - Work Parcel 6 - External Lighting

2.6.1 - Technical Description

Excluding Faculty of Science Main Building, Library, & Old Cafeteria					
Family	Item Description	Summary	Trade	Qty	Unit
Lighting Fixtures	A- Poles				
	10 m lighting pole	Pole with Lamp 1 x 250 watts HPS	A13	173	Nr
	10 m lighting pole	Pole with Lamp 2 x 250 watts HPS	A13	109	Nr
	10 m lighting pole	Pole with Lamp 3 x 250 watts HPS	A13	15	Nr
	6 m lighting pole	Pole with Lamp 1 x 150 watts HPS	A13	80	Nr
	3 m lighting pole	Pole with Lamp 36 watts PL	A13	11	Nr
	3 m lighting pole	Pole with Lamp 70 watts HPS	A13	121	Nr
	3 m lighting pole	Pole with Lamp 100 watts SDW	A13	119	Nr
	B- Bollard				
	30 cm Bollard	Bollard with lamp 8, 10 and 13 watts PL	A13	176	Nr
	60 cm Bollard	Bollard with lamp 8, 10 and 13 watts PL	A13	346	Nr
	90 cm Bollard	Bollard with lamp 8, 10 and 13 watts PL	A13	214	Nr
	120 cm Bollard	Bollard with lamp 8, 10 and 13 watts PL	A13	53	Nr
	C- Projectors				
	Projector for façade lighting	Projector with Lamp 250 watts HID	A13	20	Nr
	Projector for façade lighting	Projector with Lamp 150 watts HPS	A13	59	Nr
	Projector for façade lighting	Projector with Lamp 100 watts HPS	A13	1	Nr
	Projector for façade lighting	Projector with Lamp 70 watts HPS	A13	13	Nr
	D- Buried Projectors				
	Buried projector	Projector with Lamp 70 watts HPS	A13	50	Nr
	Buried projector	Projector with Lamp 150 watts HPS	A13	28	Nr
	E- Tree Projectors				
	Tree projector	Projector with Lamp 1 x 120 watts	A13	134	Nr
F- Wall mounted Fixtures				Nr	
wall mounted fixtures	Wall mounted fixture with louvre & Lamp 1 x 9 watts	A13	413	Nr	
Panel Boards (EOLP)	Panel boards for external lighting	A13	20	Nr	
Cables & Accessories	Cables for external lighting	Cables for external lighting, sizes 4 x 205 mm ² to 4 x 35 mm ²	A13	40,000	Lm
	PVC conduits and sleeves	PVC conduits & sleeves for cabling	A13	40,000	Lm
Earthing System	Earthing for external lighting	Earthing rods in pits for external lighting (for each pole)	A13	1	Ls
Access Control	Control barrier		A13	8	Nr
	Panel and all accessories for control barrier		A13	8	Nr

Faculty of Science Main Building, Library, & Old Cafeteria					
Family	Item Description	Summary	Trade	Qty	Unit
Lighting Fixtures	A- Poles				
	10 m lighting pole	Type : A 1 / 250 w / E40	A13	6	PCs
	F- Wall mounted Fixtures				
	wall mounted fixtures	500 w Projector 2 ended	A13	8	PCs
Cables & Accessories	Cables for external lighting	Cables for external lighting, sizes 4 x 4 mm ²	A13	220	Meter
	PVC conduits and sleeves	PVC conduits & sleeves for cabling	A13	220	Meter
Earthing System	Earthing for external lighting	Earthing cable for external lighting, sizes 4 mm ²	A13	220	Meter

2.6.2 - Technical Scope Of Work: Operation

- 1- Compliance with the requirements of the Contract Documents.
- 2- Contractor shall be responsible for the coordination with the Lebanese University buildings managements in order to operate the external lighting described in Work Parcel 6 as per academic time schedule and/or management requirements.
- 3- Contractor shall be responsible for keeping installed external lighting components satisfactory to perform their desired functions such as:
 - a. Control of contactors in case of emergency to provide maximum services using available resources.
 - b. Control of external lighting installations via building management system by keeping the key parameters effective (load shedding monitoring, etc...)
- 4- Contractor shall be responsible to provide regular reports (twice per year) showing the consumption of main consumables (such as Lamps, Fuses, Ballasts, etc...).
- 5- Contractor shall be responsible to operate the external lighting installations taking into account energy saving measures as for and non-restricted to the following:
 - a. Planning and updating of schedules for operation of systems according to the results of the reports mentioned in paragraph 4 above.
 - b. Other energy saving measures as for power consumption should be taken into consideration for effecient operation.

2.6.3 - Technical Scope Of Work: Maintenance

- 1- Contractor shall be responsible to perform the preventive (routine) and corrective (emergency) maintenance of lighting installations, which are defined in the Contract Documents.
- 2- All works should be performed in accordance with the manufacturer's recommendations.
- 3- Reporting:
 - a. The Contractor shall be responsible to provide regular (Twice per year) reports showing the maintenance works executed, along with suggestions for the future maintenance tasks status of external lighting installations.
 - b. The Contractor shall be responsible to provide emergency reports for problems that may occur. These reports shall contain the problem and the corrective measures and budgeting.

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6.2.7 - Work Parcel 6 - Sports Fields

2.7.1 - Technical Description

Family	Item Description	Summary	Trade	Qty	Unit
Running Track (K1)	Precast Drainage gutters	Precast concrete gutters with galvanized covers.	E09	400	Lm
	Track field	Synthetic finished track field, 13 mm thick.	E09	3,192	m ²
	D-Sections (Games zones)	Synthetic finished track field, 13 mm thick.	E09	2,680	m ²
	Marking (Lining of Running Track and Football field)	Polyurethane paint applied by special machine	E09	1	Ls
	Manholes & Electrical pits + Covers	Concrete Manholes/Pits with cast iron covers	A07	1	Ls
	Grandstand drainage channel	Cast in situ concrete channel for grandstand drainage	A07	170	Lm
Football Field (K1)	Drainage pipes	Underground perforated PVC pipes	A07	1,500	Lm
	Irrigation network	HDPE & LDPE pipes + Waven fittings & accessories	A64	700	Lm
	Automatic valves (Irrigation)	3" main shut-off valve 1 No., 3/4" Quick coupling valve 3 No., 2" solenoid valve 8 No, 1" solenoid valve 2 No.	A64	14	Nr
	Sprinklers (Irrigation)	Pop-Up sprinklers, RAIN BIRD Complete, Half and Quarter circle	A64	35	Nr
	Grass for Football field and surrounding Islands	Grass (seeds) planted 70% Bermouda + 30% Raygrass	A09	10,800	m ²
	Handrails	Galvanized painted steel	E05		Lm
	Guardrails	Galvanized painted steel	E05		Lm
Athletic Equipment (K1)	Long & Triple jump equipment	Calling boards, landing areas, ...	D03	1	Ls
	High Jump equipment	Poles, Jump bar & Landing foam mattress	D03	1	Ls
	Pole Vaulting equipment	Vaulting poles, Jump bar, Bar slider, Landing area (Foam blocks), Pole Vault box	D03	1	Ls
	Shot Throwing equipment	Metalic throwing circle	D03	1	Ls
	Discus Throwing equipment	Discus throwing circle, Throwing cage/net	D03	1	Ls
	Hammer Throwing equipment	Hammer throwing circle, Throwing cage/net	D03	1	Ls
	Javelin Throwing equipment	Javelin, Trowing marks, ...	D03	1	Ls
Football field Equipment (K1)	Ground Tracing equipment	Tracing wheelbarrow, 18/20 kg high capacity, with front castors for direction.	D03	1	Nr
	Corner posts	Flexible type with official pennons 0.45m x 0.45m, Tear-proof and retroluminescent, 1 face yellow and one face red.(1 Set= 4 posts)	D03	5	Set
	Football goals	Official competition goal made of tubular steel, diameter 100m, dismantable with sleeves, welded hooks for net fixation, polyester paint finish.(1set = 2 goals)	D03	3	Set
	Football Nets	Made of very high resistance 4mm threads with pegs to fix nets to the ground. (4 Nets + 100 Pegs)	D03	4	Nr
	Masts Set	Masts supporting goal's nets (1 set = 4 masts)	D03	2	Set

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6.2.7 - Work Parcel 6 - Sports Fields

Multi-purpose Court (K2)	Concrete Grandstand	Cast in situ concrete Grandstand, capacity approx. 2000 spectators	A12	1,200	Lm
	Drainage channel	Concrete channel with concrete grating covers for stand & court drainage	A12	150	Lm
	Multi-purpose Playground	Synthetic finished 6mm thick.	E09	1,018	m ²
	Marking (Lining)	Polyurethane paint applied by special machine	E09	1	Ls
	Handrails	Galvanized painted steel	E05		Lm
	Guardrails	Galvanized painted steel	E05	140	Lm
Multi-purpose Court Sports equipment (K2)	Handball Goals with Nets	Handball goals of 3m x 2m, front face of 80mm x 80mm treated aluminum, red/white painted	D03	3	Nr
	Volley-Ball equipment with Net	Poles: Removable telescopic posts, with 1 Net: Polyethylene thread of 2.5mm cross-section.	D03	2	Nr
	Basket-Ball Goals	Complete set of goals for basket-Ball and mini Basket including rings & nets	D03	4	Nr
	Tennis court equipment	Removable tubes of 90mm diameter (2 pairs), with net (2 Nos) of 12.8m x 1.0m, polyethylene	D03	2	Set
Swimming Pool Equipment (K3)	Olympic swimming line of 50 m with floats	Stainless steel olympic swimming-line for a 50m pool with polyethylene floats of clear color	D03	9	pc
	Rolling trolley	Tubular light alloy construction, mounted on 2 castors for easy moving. capacity : 150m of lines (or 3 lines of 50m each)	D03	8	pc
	Swimming lines of 25 m with floats	Stainless steel lines, with fully unsubsersible floats	D03	5	pc
	Boxes for anchoring swimming-lines	20 boxes for 50m pool and 12 boxes for 25m pool	D03	32	pair
	False start line with s/s brackets	constituted of a rot-proof halyard, supplied with colored flags, stretched between 2 detachable brackets made of stainless steel tubes (316L quality)	D03	1	LS
	Backstroke swimming line with s/s brackets	backstroke swimming-line including stainless steel brackets	D03	1	LS
	Removable pool ladder	Made of stainless steel, with anti-slippery polyester steps	D03	4	LS
	Starting pins	Anti-slippery platform made of reinforced polyester, stainless steel footings coated with epoxy resin	D03	16	LS
	Port-holes	Laminated glazing 3 folds portholes of thickness	D03	4	LS
	Pool thermometer	Thermometer with floating ring to be supplied with small chain.	D03	1	LS
	Lockers	Steel painted lockers with locks	D03	222	LS
Tennis & Basketball Courts	Playground Paving	Special floor finishes executed of successive layers, top layer is shock-absorbent (binder with rubber particles. (8 Tennis + 4 Basket-Ball	E09	7,312	m ²
	Enclosure Type B with Gates	Metalic Fence, 5cm mesh, polyethylene coated (Gates: single 2 Nos., double 8 Nos)	E05	600	Lm
	Drainage Gutters with grating covers	Concrete channel with concrete grating covers for courts water drainage	A07	310	Lm

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6.2.7 - Work Parcel 6 - Sports Fields

Tennis & Basketball Courts (Sports Equipment)	Tennis court equipment	Removable tubes of 90mm diameter (8 pairs), with net (16 Nos) of 12.8m x 1.0m, polyethylene cabled of 3mm diameter, 4.5mm mesh	D03	8	Set
	Basket-Ball Goals	Complete set of goals for basket-Ball and mini Basket including rings & nets	D03	8	Nr

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6.2.7 - Work Parcel 6 - Sports Fields

2.7.2 - Technical Scope Of Work -Sports Fields

(Football Field, Open Air Multipurpose Stadium, Running Tracks, Basketball & Tennis courts)

2.7.2.1 Lawn Maintenance

Preventive

*All lawn areas shall be mowed regularly and be free of weeds and disease.

*A balanced commercial fertilizer shall be applied to all areas as needed to maintain them in a healthy, thriving condition.

*The Lawn in the Football Field shall be kept in healthy thriving condition and the Contractor shall provide sufficient personnel and equipment to perform all necessary works in a professional and workmanlike manner to the satisfaction of the Client and in keeping with generally accepted horticultural practices and mechanical techniques.

Regular

*All lawn areas shall be completely weeded once each week.

*A balanced commercial fertilizer shall be applied to all areas every month or as needed to maintain them in a healthy, thriving condition. Fertilizer shall be broadcast evenly by hand or with a broadcast spreader and shall be thoroughly watered in.

*The Contractor shall carry out regular inspections of all lawn areas to check for signs of disease or pest attack. He shall be responsible for rectification of the problem and selection and application of suitable fungicides or pesticides. The choice and use of these must conform to all relevant laws and they must be applied in strict accordance with the manufacturers' recommendations.

*Lawn shall be checked weekly and reseeded if any uneven holes, humps, bald or dead areas are spotted by leveling and or reseeding.

2.7.2.2 Irrigation System Maintenance

Preventive

*The purpose of maintaining the irrigation system is to keep it running and functioning correctly and to keep it in good condition to deliver water to all of the lawn areas.

*Irrigation lines and equipment must be checked, tested, and repaired if required as soon as possible (same day) to avoid any damages to the system, lawn, plants, and adjacent structures.

*The quality of water both supplied by temporary means and through the irrigation system shall be tested to avoid any damages to the lawn due to polluted or high salt water.

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6.2.7 - Work Parcel 6 - Sports Fields

Regular

- *Repair and replace any equipment damaged or broken. Keep heads and lines flushed clear.

- *Test the irrigation system every two months for any damages or leak and if found to be malfunctioning then repair within 2 hours.

- *Flush the supply lines every two months to keep the lines clear.

- *The contractor shall be responsible for repair or replacement of any damaged or broken irrigation equipment including automatic irrigation controllers, automatic or manual sprinklers or valves, underground piping or any other component of the system.

- *Properly coordinate the various time clocks and adjust schedules to provide adequate water to maintain all planted areas in a thriving condition. Watering schedules shall be arranged so as not to interfere with the Client's use of the facility.

- *The quality of water both supplied by temporary means and through the irrigation system shall be tested every two months right through the Maintenance Period. To accomplish this, the Contractor shall arrange the spraying operations at suitable hours of the day or night to keep water temperature within these limits.

Emergency

- *In case of malfunction of the irrigation system, provide irrigation water from an approved source within 24 hours, meeting the minimum requirements including any associated transport, pumping or storage facilities required.

- *Stop and repair any leakage to the main and secondary irrigation lines (16mm,25mm,32mm,40mm,50mm,63mm,110mm) immediately and as soon as possible.

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6.2.7 - Work Parcel 6 - Sports Fields

2.7.2.3 Storm Drainage Network Maintenance

Preventive

*The purpose of maintaining the storm drainage network is to be kept clean, undamaged, and in good working conditions as it is designed for.

*The storm drainage network shall be cleaned and flushed thoroughly ensuring no foreign material has entered the system to prevent any possible clogging of the network, flooding or seepage to adjacent utilities or structures.

*To respond in a short time to any complaints or request from the client, to correct the problems, and to prevent further damages to the network and adjacent structures.

Regular

*The storm drainage network shall be visually inspected.

*The storm drainage network shall be cleaned and flushed every six months and or when required.

*All manholes, gullies, drains, frame and covers shall be monthly checked, adjusted and repaired for any settlements, cracks, or closing mechanism.

Emergency

*If any of the storm network get clogged or broken an immediate action must be taken to clean and flush the lines and to correct the problem.

2.7.2.4 Athletics Track & Open Air Multipurpose Court

Preventive

The purpose of maintaining the running tracks, basketball, & tennis courts is to:

*Guarantee comfortable and safe conditions to students and athletes.

*Respond quickly to any emergency situation.

*Provide sufficient personnel and equipment.

*Perform all necessary works in a professional and workmanlike manner to the satisfaction of the client.

*The Open air multipurpose court and the running track field must be checked and inspected for any sign of damages and shall be repaired as soon as possible to prevent any further damages.

*The surface marking of the athletics track and the open air multipurpose court must be checked and repainted if

*Sand and gravel must not enter the court, in order to avoid their action as abrasive elements that will enormously accelerate wear on the synthetic pavement.

*Only suitable footwear must be worn for optimum durability and to prevent any damages to the sports fields.

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6.2.7 - Work Parcel 6 - Sports Fields

Regular

*The floor of the Open Air Multipurpose Court and the Running Track Field (synthetic) must be checked and inspected weekly for any sign of damages, and shall be repaired adequately as per the Manufacturer Requirements and as soon as possible.

*In the autumn, if the court is in a treed area, the Contractor shall collect fallen leaves in order to avoid them rotting on the pavement or the sports fields.

*The surface marking of the Athletics Track and the Open Air Multipurpose Court must be repainted every six months and if required or if it becomes faded.

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6.3.1 - List of As- Built Drawings

IRN	Trades	Block/Zone	Subzone or Scale	Type of Document	Level of Plans	Running Number	Revision
02	B 0 1	R 2 1	1 3 2	B			
Internal Revision Number		Zone defining the Building Examples: R2: Female Dorm R1: Male Dorm TS: Type Spaces OO: Whole Project	0= (Whole Zone) 1,2,3,4,5,6 (Parts of zone or whole zone) 7= Miscellaneous 8=Typical Spaces	1= Plans 2=Sections 3=Elevations 4=Details on A0 5=General Details on A3 6=Particular Details on A3 7=Schedules 8=Miscellaneous	0=Foundation 1=2nd Basement 3=Ground Floor 4=1st Floor 5=2nd Floor 6=3rd Floor 7=4th Floor 8=5th Floor 9=Roof	To facilitate diff documents of the same type and the same location	A, B, C, D

Trades (As needed for Drawing Numbering)

Trade A		Trade B		Trade C		Trade D		Trade E	
Site Works		Structures & Outboards		Technical Equipment		Technical Equipment		Finishes	
A05	Main Pumping Station	B00	General Structure Drawings	C00	General M+E Drawings	D02	Swimming Pool Treatment equipment & accessories	E00	Architectural Executive Drawings
A06	Water Supply	B01	Concrete Works	C10	HVAC	D04	Decorative Fountains		
A07	Waste Water	B02	Frame Works & Canopies	C20	Plumbing	D08	Scientific Lab Equipment		
A11	External Signs & Boards	B03	Waterproofing & Joints	C30	High Voltage Installation General				
A13	Electrical Network	B05	External Aluminum & Glazing	C31	Transformer Substat				
A14	Low Current (Refer to C04)	B09	Reinforcement	C32	Static UPS System				
A15	Chilled & Heating Water	B10	Precast Elements	C33	Lighting layout				
		B11	Concrete Drawings with Reinforcement	C34	Miscellaneous				
				C35	Earthing System & Lightning Project				
				C40	Low Current Installation General				
				C41	Telephone Systems				
				C42	Computer Network				
				C43	Sound System				
				C44	Fire Alarm System				
				C45	Clock System				

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6.3 - Work Parcel 6: External Works

6.3.2- List of Suppliers and Subcontractors involved in the project

Trade: Roads & Parkings

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Asphalt (Bituminous Concrete)	South Contracting		LAC (Lebanese Asphalt Co.)	
2	Kerbstones (All types)	South Contracting		Mega Prefab	
3	Road Marking	South Contracting		Verital Venici Speciali	
4	Dish Channel	South Contracting		Mega Prefab	

Trade: Irrigation Networks

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Pipes (HDPE & LDPE)	Prestige Garden		MAIS,Future Pipes Industries	
2	Accessories & Fittings (PVC)	Prestige Garden		FIP	
3	Accessories & Fittings (Ductile Iron)	Prestige Garden		Pont A Mousson	
4	Spray heads & Sprinklers	Prestige Garden		Weather Matic	
5	Control cables	Prestige Garden		Liban Cables	
6	Electrical Control Valves (ECV)	Prestige Garden		Weather Matic	
7	Quick Coupling Valves (QCV)	Prestige Garden		Weather Matic	
8	Controllers (Stations)	Prestige Garden		Weather Matic	

Trade: Sewage & Storm Water Networks

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Non Reinforced Circular Concrete Pipes	CONTRA		Beton BEKAA	
2	PVC Pipes	CONTRA		Future pipes	
3	PVC Pipes	CONTRA		ULPI	
4	Perforated PVC Pipes	CONTRA		Future pipes	
5	Precast Manholes & Gullies	CONTRA		CONTRA	
6	Manhole Covers with Frames	CONTRA		CASSARDGIAN	
7	Cast Iron Channel Grating	CONTRA		CASSARDGIAN	
8	Drairage PVC Pipe fittings WAVIN	CONTRA		WAVIN	
9	Manhole Galvanized Steps	CONTRA		CONTRA	

Trade: Pavement

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Agglomerated Tiles (Bush-Hammered)	AFAK		DERVICHE Y. HADDAD	
2	Agglomerated Tiles (Exposed)	AFAK		DERVICHE Y. HADDAD	
3	Concrete Tiles (Coloured)	AFAK		DERVICHE Y. HADDAD	
4	Agglomerated Tiles 3 cm yellow,Exp/Bush	AFAK		MARBLE & CEMENT	
5	Flush Concrete Curbs	AFAK		AFAK	
6	Bike Lane Paving Top Crete	TOPCRETE		TOPCRETE	
7	Borders (Embedded)	AFAK		AFAK	
8	Borders (Exposed)	AFAK		AFAK	
9	Mastic Sealant for Joints	AFAK		LAFARGE	

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6.3 - Work Parcel 6: External Works

6.3.2- List of Suppliers and Subcontractors involved in the project

Trade: Planting

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Trees, Shrubs, Ground covers, Lawn & Climbing Plants	Prestige Garden		Prestige Garden	
2	Fertilizers (Peat Moss)	Prestige Garden		KITEXIM	
3	Fertilizers (NPK 17-17-17)	Prestige Garden		BASF	
4	Fertilizers (Powergro)	Prestige Garden		Scte.des Usines des Engrais	
5	Tree Stakes & Guying	Prestige Garden		Prestige Garden	
6	Insecticides, Pesticides, & Fungicides	Prestige Garden		Prestige Garden	
7	Tree Pit Grating	Prestige Garden		CASSARDGIAN	
8	Tree wrapping Paper	Prestige Garden		Prestige Garden	

Trade: Urban Furniture

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Pergola's				
2	Bollards				
3	Benches	ZUBLIN		ZUBLIN	
4	Fence (Precast Concrete)				
5	Fence (Metal Enclosure)	ZUBLIN		GUARDIAN INDUSTRIES	
6	Bicycle Racks				
7	Handrails				
8	Guard Rails				
9	Gates			CSI	

Trade: External Signs & Boards

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Totem	ZUBLIN		AGEV	
2	Directional Signs	ZUBLIN		AGEV	
3	Panel	ZUBLIN		AGEV	
4	Other Signs	ZUBLIN		AGEV	

Trade: External Concrete Structure

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	External Retaining Walls	AFAK		MEEX	
2	Rip Rap Walls	ZUBLIN		ZUBLIN	
3	External Stairs	AFAK		MEEX	
4	Wheel Chair Ramps	ZUBLIN		MEEX	

Trade: External Lighting

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6.3 - Work Parcel 6: External Works

6.3.2- List of Suppliers and Subcontractors involved in the project

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Poles	Slomia		AL BAPTAIN,	
2	Bollards	Light & Power		Boluce	
3	Projectors	Light & Power		Philips,Colombo,Civic,Coribni	
4	Wall Mounted Fixtures	Light & Power		Disano	
5	Panel Boards	Engineering Group Contractors		Engineering Group Contractors	
6	Cables & Accessories	Liban Cable		Liban Cable	
7	Earthing System	Danzikian		Furse	
8	Control Barrier	Danzikian		Danzikian	

Trade: Sports Complex Fields

	Equipment	Subcontractor/S upplier	Contact	Manufacturer	Contact
1	Synthetic field (Stadium)	OVETRA		STOCKMEIER	
	Playground field (grass)	ARROW		ARROW	
2	Synthetic field (Multi-purpose court)	OVETRA		STOCKMEIER	
3	Tennis courts & Basket-Ball Fields	OVETRA		COMPOSAN	
4	Sports Equipment				

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6.3 - Work Parcel 6: External Works

6.3.3 - List of Consumables

	Consumables	Systems/Location	Form
	Road		
1	Kerbstones	Roads/External Works	Pcs
2	Asphalt	Roads/External Works	Ton
3	Road Marking	Roads/External Works	Drums
4	Cast Iron manholes Frames	Roads/Landscape/Pavement	Pcs
5	Cast Iron manholes Covers	Roads/Landscape/Pavement	Pcs
6	Cast Iron Channel Grating	Roads/External Works	Pcs
	Irrigation		
1	HDPE/LDPE Pipes	Planting/Landscape	Rolls
2	Control Cables	Planting/Landscape	Rolls
3	Spray Heads, Sprinklers	Planting/Landscape	Pcs
4	Control Valves	Planting/Landscape	Pcs
5	Controllers (Station)	Planting/Landscape	Pcs
	Pavement		
1	Tiles	Paved areas	Pcs
2	Jointing Sealant	Paved areas	Tubes
	Planting		
1	Trees, Shrubs, ...	Landscape areas	Pcs
2	Fertilizers, Insecticides, Fungicides	Landscape areas	Containers
3	Trees stakes and guying	Landscape areas	Pcs
4	Fertilizers, Additives	Landscape areas	Bags
5	Tree Pit Grating	Landscape areas	Pcs
	Sewage & Storm		
1	PVC Pipes	Sewage & Storm Network	L.M.
2	Concrete Pipes	Sewage & Storm Network	L.M.
	Urban Furnitures		
1	Pergola's	Urban Furnitures/External Works	Pcs
2	Bollards	Urban Furnitures/External Works	Pcs
3	Benches	Urban Furnitures/External Works	Pcs
4	Fence (Precast Concrete)	Urban Furnitures/External Works	L.M.
5	Fence (Metal)	Urban Furnitures/External Works	L.M.
6	Bicycle Racks	Urban Furnitures/External Works	Pcs
7	Handrails	Urban Furnitures/External Works	L.M.
8	Guard Rails	Urban Furnitures/External Works	L.M.
9	Gates	Urban Furnitures/External Works	Pcs

