



TENDER DOSSIER

FOR

Works of Side Streets Paving with Interlock Tiles and Canal Covering & Landscaping in Bahry Sekka Hadid Area-Qlayment Qalyubeya Governorate-Egypt

VOLUME 3: TECHNICAL SPECIFICATIONS

Prepared by إعداد



and



TENDER DOSSIER for D2-QAL2
Works of Side Streets Paving with Interlock Tiles and Canal
Covering & Landscaping in Bahry Sekka Hadid Area-Qlayment –
Qalubeya Governorate
ملف مناقصة أعمال رصف الشوارع الداخلية ببلاط الانترلوك وتغطية قناة وتجميل المكان
بمنطقة بحري السكة الحديد بقلوب



This Specification consists of two Parts:

PART A: Side Streets Paving and Canal Covering Specifications

PART B: Covered Canal Lanscaping Specifications

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PART A: Side Streets Paving and Canal Covering Specifications

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1 SCOPE OF WORK

The works include:

1. Paving side streets project in Qalyoub Sekka Hadid informal area, covers the following zones and as shown in figure 2-1:
 - Streets located in Zone (1) are 36 streets with total length 3650 m, with average width 4.65 m, and total area of 19593 m².
 - Streets located in Zone (2) are 16 streets with total length 1580 m, with average width 4.85 m, and total area of 7845 m².
2. Covering Sanafer Canal in the same informal area with 190 m length with covering landscaping.
3. Paved the road in front of canal covering with 260 m length asphalt layer and 8m width.

Based on the classifications for all internal street roads, the streets which needed to be paved with interlock tiles are included in the project and listed below in figure 1-1. Figure 1-1 shows the streets names, lengths, and areas. Annex No. (1) shows the project location.

S. N	Street name	Width (m)	length (m)	Area (m ²)	Zone
1	Hassan Khalil St.	5	145	725	Zone 1
2	Off Hassan Khalil St. 1	3.5	35	122.5	
3	Off Hassan Khalil St. 2	2	35	70	
4	Off Hassan Khalil St. 3	3	25	75	
5	Off Hassan Khalil St.4	4	35	140	
6	Mahmoud Heikal Alley	4	35	140	
7	El Zabet Kamal St.	5	165	825	
8	Off El Zabet Kamal St.	4	30	120	
9	Ghobashi St.	5	165	825	
10	Abdel Aziz Zaki St.	6	165	990	
11	Off Abdel Aziz Zaki St.	4	30	120	
12	Nasr St.	6.5	170	1105	
13	Off Nasr St.	4	20	80	
14	Eisa El Komy St.	7	225	1575	
15	Abdel Monam El Bakry St.	5	235	1175	
16	Zaki Fayek St.	5.5	100	550	
17	Sami El Mebayed St.	5	60	300	
18	Badr Lane	6	75	450	
19	Hassan Abou Habal ST.	6	120	720	
20	Off Fathi Kaldash St.	4	60	240	
21	Hassan Bayoumi St.	5	55	275	
22	Abdel Hady St.	4.5	55	247.5	
23	Azamel St.	6	140	840	

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S. N	Street name	Width (m)	length (m)	Area (m ²)	Zone	
24	Fathi Kaldash St.	5.5	135	742.5		
25	Ibrahim Yousef St.	6	145	870		
26	Hassan El Asha St.	5	275	1375		
27	Sedek Aid St.	6.5	290	1885		
28	Off Sedek Aid St. 1	3	15	45		
29	Off Sedek Aid St. 2	3	25	75		
30	Off Sedek Aid St. 3	3	25	75		
31	Off Sedek Aid St. 4	3	25	75		
32	Off Sedek Aid St. 5	3	25	75		
33	Khalil Maeaan St.	6	285	1710		
34	Off Mohamed Abou Yousef St.	5	55	275		
35	Off El-Asher Min Ramadan St.1	3	85	255		
36	Off El-Asher Min Ramadan St.2	5	85	425		
37	Mohamed Abou Yousef St.	4.5	270	1215		Zone 2
38	Ghazal St.	4	120	480		
39	Abdel Rahman El Kawakby St.	5	120	600		
40	El Ashry St.	4.5	120	540		
41	Abdel Hady St.	4.5	125	562.5		
42	El Bayoumy St.	6	70	420		
43	Ghanem St.	5	115	575		
44	Off Ghanem St. 1	2	20	40		
45	Off Ghanem St. 2	4	30	120		
46	Abdel Halim Mahmoud St.	7.5	120	900		
47	El Manfloty St.	4.5	125	562.5		
48	Gamea El Shaimaa St.	7	95	665		
49	off teraet el zaitoun st.	6	45	270		
50	Abou El Fetouh st.	4	90	360		
51	Abdel karim st.	5	75	375		
52	Gaafar st.	4	40	160		
Total zone 1 + zone 2			5230	27,438		

Figure (1-1) Scope of Work Streets.

2 WORK ITEMS

In general, the paving work items include the following:

1. Earthwork (excavation and back filling). The back filling for embankment construction (if any) shall be carried out in layers in accordance with the lines, grades, and cross sections. Excavation includes any disintegrated soil material or non-homogeneous base material (if any) and with the removal of these material outside the work site. The unit price includes all required work per cubic meter.
2. Excavations include any disintegrated or non-homogeneous base course materials (if any) and disposing it outside the work area includes all required work.

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3. The back filling for embankment construction shall be carried out in layers (25cm) in accordance with the lines, grades and cross sections shown in the drawings.
4. Construction of a tack coat layer underneath the asphalt wearing surface layer, using a rapid curing liquid asphalt type (RC -3000) at a rate of 0.5 kg/m², the unit price includes all required work per square meter.
5. Construction of a hot asphalt concrete wearing surface layer, 5 cm thick after compaction and of width and length shown in the drawings, using clean, hard, tough, durable and sound crushed limestone of good adherence asphalt, and according to specifications together with asphalt cement of penetration grade 60/70, the unit price includes all required work per square meter.
6. Furnishing and constructing of interlock tiles (any type) for streets.
7. Furnishing and constructing plain concrete Edge Restraints units with the dimensions 12/15x30x50 cm for side-walks, according to the drawing.
8. Implementation of catch basins according to specifications, drawings, and complete all works.
In addition, includes the connection pipes between catch basin in UPVC material with 160mm diameter and complete all works according to worker ship standards.
9. Raising the level of the existing manholes according to the level of the new layers.

3 SPECIAL PROVISIONS

The paving work will take place in an existing residential area where some special technique for mobilizing construction equipment should be maintained. The contractor shall get the approval of the Engineer in charge or the owner's engineer for the proposed construction technique and equipment.

Care should be taken regarding mix laying down technique. If hand or manual mix laying down takes place due to difficulty of getting the trucks or the paving machine into the paving site, the engineer should watch for mix potential to segregate and mix temperature. As well, compaction shall be applied immediately after laying down the mix to ensure sufficient temperature required for healing and curing.

Selected Roads to be paved will be designated by the owner. However, the structural design of the pavement section is based on samples taken from roads. The structural pavement section requires the construction of base course layer, prime coat, binder course, tack coat, and asphalt concrete surface layer.

All Special Provisions of all work items shall follow the construction specifications (Latest Edition) for Egyptian Code for roads, all specification requirements regarding material, equipment, labors...etc. shall be met including any amendment to the specifications mentioned herein.

The work items are to be executed in accordance with the following:

1. Egyptian Code for roads (2008).
2. The special specifications (this document).
3. Instructions of the Governorate of Cairo/Giza and the supervising engineer.
4. The enclosed drawings.
5. Recommendations of the consultant.

4 SPECIFICATIONS OF PAVEMENT LAYERS

4.1 Preparation of subgrade Soil

Earth work and preparation of subgrade soil shall be carried out in accordance with Egyptian Code for roads (2008) to activate the highest dry density at optimum moisture content according to the proctor compaction test. The compacted prepared layer thickness should not be less than 30 cm. The excavation should include any disintegrated materials (if any) and disposing it outside the work area.

The unit price will include all required work per cubic meter.

4.2 Construction of a Base Course Layer

Construction of base course layer using graded crushed limestone aggregates in accordance with the specifications of Egyptian Code for roads (2008) with a total thickness of 25 cm after compaction and in widths and lengths shown in the drawings. It should be constructed in two layers. The item includes all necessary works for supplying materials, laying for spreading, compacting and others. The unit price for this item shall be in square meter.

4.2.1 Physical Requirements

The base course material should meet the following requirements: -

1. Crushed particles should be granular and free from flat and elongated fractions.
2. The California Bearing Ratio (CBR%) for base material should be no less than 60 %
3. The loss in Los Angeles Abrasion should be less than 50 % (after 500 cycles)
4. For material passing sieve size no. 40:
Liquid limit <25%
Plasticity Index < 6 %
5. For material retained a sieve size no. 10:

The water absorption should be less than 10%.

4.2.2 Grading of Base Material

The base course material shall meet one of the sieve size grading shown in Table below. The source of this material should be approved by the supervising engineer and samples should be taken for test before laying down the material.

Sieve size And no.	% Pass by weight			
	A	B	C	D
2"	100	100	100	100
1.5"		70-100		100
1"		55-85	75-95	70-100
3/4"	30-65	40-70		60-90
3/8"	25-55	30-60	40-75	45-75
No.4	25-55	30-60	30-60	30-60

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No.10	15-40	20-50	20-45	20-50
No.40	8-20	10-30	15-35	10-30
No.200	2-8	5-15	5-20	5-15

Figure (4-2-2-1) Table of Grading of Base Course

4.3 Construction of a Prime Coat layer

Construction of a prime coat layer on the top of the limestone base course layer using medium curing liquid asphalt type (MC-30) in accordance with the specifications applied with a rate of 1.5 kg/m². The unit price includes all required work per square meter.

4.3.1 Material Specifications

The medium curing liquid asphalt used for the prime coat should meet Egyptian Code for roads (2008). The asphalt shall be approved by the supervising engineer.

4.3.2 Curing and Surface Cleaning

The applied tack coat material should be left for at least 24 hours before opening to traffic. Water should be sprayed every two or three days until applying the next pavement layer. Sand should be applied over asphalt bleeding spots. The surface should be cleaned before applying the next pavement layer. As well, irregularity of surface should be maintained before applying the next layer.

4.4 Construction of a Hot Mix Binder Course Layer

Construction of a hot premix macadam layer, 5 cm thick after compaction on the top of the limestone base course layer covered with a prime coat layer with widths shown in the typical cross sections. The hot premix macadam consists of asphalt cement with penetration grade 60/70 and clean, hard, tough, durable and sound crushed limestone aggregates. The unit price includes all required work per square meter.

Specifications of the individual materials (asphalt cement and aggregates) which form the asphalt mix of the binder course layer are presented in Section 3.6 of the asphalt mix required for the surface layer.

4.5 Construction of a tack coat layer

Construction of a tack coat layer using rapid curing liquid asphalt type (RC-3000) with a rate of 0.5 kg/m² underneath the asphalt wearing surface layer. The unit price includes all necessary work per square meter.

4.5.1 Material Specification

The rapid curing liquid asphalt used for the tack coat should meet the Egyptian code for roads (2008) and shall be approved by the supervising engineer.

4.5.2 Scheduling of Application

The sprayed area by the tack coat material should not exceed the expected area of surface layer to be paved and completed in one day. This will ensure that the tack coat will not dry before applying the final surface layer.

5 SIDEWALKS WORKS

5.1 Description of work

Furnishing and constructing of interlock tiles (any type) with the approved color and shape 12/25 * 8cm, with 10 cm fine sand under it in according to the specification and manufacture slandered.

6 TRAFFIC SIGNS

This work consists of supplying and installing banners traffic of all kinds, whether guidance or warning or regulatory with columns, groups and all necessary items as shown in drawings or as determined by the supervising engineer, and all aspects and characters from the signs are in accordance with the dimensions and colors specified by the specification.

A - banners:

Signs made of aluminum alloy high quality with a thickness of 2.5 mm and shoddy, or tin coated port or steel plates, cold rolled or any similar material approved by the supervising engineer, that these banners painted as shown in drawings or as instructions supervising engineer.

B- Signs Poles:

Banners poles made from either aluminum alloy or galvanized steel or steel painted as shown in drawings or as determined by the supervising engineer, and must be relevant menus be enough resistance to the pressure of wind and banners loads. And it should be coated items which made of pipes or other sectors approved by the supervising engineer after cleaned of rust and impurities completely three aspects of the gray paint.

7 PAINTED FLOOR SIGNS

This work includes drawing road signs, which include lane lines, the axis of the road, sidewalks, and pedestrian crossing areas (if any) and shares the floor and otherwise in place on the surface of the pavement as shown in drawings or as determined by the supervising engineer.

8 SPECIFICATIONS OF INTERLOCK LAYERS

The following points should be taken into consideration:

1. Prior to excavating, check with the local utility companies to ensure that digging does not damage underground pipes or wires.
2. During and after excavation, the soil should be inspected for organic materials or large rocks. If organic materials, roots, debris, or rocks remain, they should be removed and replaced with clean, compacted backfill material. Free standing water saturating the soil should be removed. After it is removed, low, wet areas can be stabilized with a layer of crushed stone.
3. Compaction of the soil subgrade is critical to the performance of interlocking concrete pavements. Adequate compaction will minimize settlement. Compaction should be at least 98% of standard Proctor density. This compaction standard may not be achievable in extremely saturated or very fine soils. Stabilization of the soil subgrade may be necessary in these situations.
4. Edge restraints are a key part of interlocking concrete pavements. By providing lateral resistance to loads, they maintain continuity and interlock among the paving units. Concrete is typical edge restraints. Full depth precast concrete or cut stone edging generally extends the depth of the base material. They can be set on compacted aggregate or concrete backfill.

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5. Masonry sand for mortar should never be used for bedding, nor should limestone screenings or stone dust. The bedding sand should have symmetrical particles, generally sharp, washed, with no foreign material. Waste screenings or stone dust should not be used, as they often do not compact uniformly and can inhibit lateral drainage of moisture in the bedding layer.

6. Concrete pavers can be placed in many patterns depending on the shapes. Herringbone patterns (45 or 90 degree) are recommended in all street applications, as these interlocking patterns provide the maximum load bearing support, and resist creep from starting, braking and turning tires. Cut pavers should be used to fill gaps along the edge of the pavement. Pavers are cut with a double-bladed splitter or a masonry saw.

8.1 Materials used for roads development

8.1.1 Interlock tiles

Interlock tiles of various kinds and sizes, forms and colours can be used in accordance with the instructions of the supervising engineer and must be suitable in all works. The contractor shall provide catalogues for tiles supplying that will be used in the project. The following requirements shall be fulfilled:

- 1- In the work of interlocking tiles are installed manually or automatically.
- 2- The average of pressure strength $\geq 34 \text{ N/mm}^2$.
- 3- Check two tiles every 1000 tiles and it must be submitted samples of tile in the accredited laboratory examination and according to the technical assets. It also must not the wild rate in overlapping tiles measured after more than 440 the wild cycle of the machine for 3 mm and not more than any of the sample per piece for 4 mm.
- 4- Tile absorption $\leq 2\%$ after 2 min, $\leq 5\%$ after 24 Hr.
- 5- Tolerance in dim. $\leq 2\text{mm}$ in all directions.
- 6- Make sand layer with 5 cm thickness under interlock tiles.
- 7- Compact by mechanical compactor with plate (35 m * .5 m), (16-24) N, vibrations (75-100) Hz.
- 8- Spaces between interfere tiles $\leq 3\text{mm}$.
- 9- When a tropical test surface using slats length of 3 meters overtaking surveys by 5 mm. And tropical surface to two rows attached to each other does not exceed 2 mm.
- 10- Not allowed to contaminate the surfaces of the tiles In the case of stains or contamination on the surface of the tiles and the contractor should replace the contaminated ones tiles with other clean one.
- 11- Do not accept any products that are not approved.
- 12- Not allowed to fill in the spaces between the tiles or around or parts tracts mortar or concrete, and when you need to fill the vacuum does not understand the full court for the contractor use a chainsaw or cut tile machine to give regular desired shape and the contractor to use tiles and ready-own endings parties Interlocking Tiles.
- 13- Move the tiles in containers packed sites take into account the need to use a lever mechanism for uploading and downloading tile packs.
- 14- The Contractor shall prepare a plan of implementation before the beginning of the work that illustrates the shape of the proposed tiles as well as the installation, taking into account the need to implement edge restraint of concrete longitudinally to adjust the straightness of the organization line before installing tile model and holds that item on the installing tiles item without paying a premium for the contractor. The contractor must obtain the approval of this plan before start working according to instructions and approval of the supervising engineer.
- 15- The amounts of implemented tiles will be calculated according to the actually implemented tiles on the site, according to net spaces and deducted spaces of manholes, catch basins, and so on. that the

supply and installation of tiles nested color and shape wanted a thickness of 8 cm is required, but at least the thickness of the surface layer of 12 mm components 350 kg Portland cement per cubic meter, sand clean graded-free impurities and pass all of the rocker No. 10 and by the appropriate oxide that achieve the desired color and to be the rest of the thickness of the tile components of a mixture of 0.4 m³ sand +0.8 m³ gravel or the age of the core does not exceed the degree of corrosion to Los Angeles test for 25% +350 kg Portland cement and the final break effort not less of 275 kg / cm² after 28 days from the date of casting.

All interlocking paving stones shall be sound and free of cracks, chips and defects that would interfere with proper placing of units or impair strength or permanence of construction.

8.1.2 Bedding and joint sand

The bedding sand should have symmetrical particles, generally sharp, washed, with no foreign material. Bedding sand should be spread and screened to an un compacted nominal 25 mm thickness. Frozen or saturated sand should not be installed. If there is an uneven base (due to inconsistent compaction or improper grading), the bedding sand should not be used to compensate for it. Over time, unevenness in the bedding sand will reflect through to the surface.

Joint Sand: fine dry sand free of soluble salts or contaminates. Sand shall comply with the following gradation requirements:

Fill type	Sieve Size	% Passing by Weight
Joint sand	5.00 mm	100
	2.50 mm	90-100
	1.25 mm	85-100
	0.63 mm	65-95
	0.315 mm	15-80
	0.160 mm	0-35
	0.075 mm	0-1

Figure (8-1-2): Sand gradation required.

8.1.3 Edge Restraints (If necessary)

Edge restraints must be set at the correct level, especially if the tops of the restraints are used for screening the bedding sand. Their elevations should be checked prior to placing the sand and pavers. Edge restraints are typically installed before the bedding sand and pavers are laid. However, some restraints can be secured into the base as the laying progresses.

Restraints are required along the perimeter of interlocking concrete pavements or where there is a change in the pavement material. Vertical walls of buildings can also provide a suitable restraint.

9 CATCH BASINS

It is a concrete room with a single or a double hole in the top surface. It allows water to enter without papers and waste. The water exiting through the drainage pipes at least 150 mm diameter and inclination of 1/100. The water discharged to the nearest manhole on the wastewater collecting network.

It must be constructed in the low level of the road, the distance between each other not exceeding 200 m. In accordance with the roads cross section, it must be placed on one side or both sides of the road next to the sidewalk directly.

The level of the effluent pipe must be high about 60 cm from the level bottom of the basin to ensure that the sand will not discharge with water. It provides with an internal barrier or a joint to prevent the discharging of floating materials.

10 CIVIL WORKS SPECIFICATION

10.1 Excavation and Backfill

10.1.1 Excavation work

The contractors under their responsibility before putting categories they should check the nature of the land and materials that will be excavated and groundwater levels and the extent of their impact on the realization of the necessary excavation for foundations of all the buildings of the various units and neighboring all it takes it from the work or support sides of drilling and dewatering to dry location, etc. and are necessary for the safety of the foundations of neighboring buildings and he has to take into account all the circumstances when developing classes for excavation work to be providing drilling sector, according to the specifications of the company of the pipes and in the foundation report .

The Contractor shall conduct pre-drilling to do to clean up the site and the land within the project boundary from all waste, grass and tree roots or foundations of the old and the settlement of the site in accordance with the levels contained drawings or by the supervising engineer and guidance instructions. When access to a good layer suitable to founded on and before pouring the concrete must be resolved well the surface and clean it from dirt and dust and excess sand shovel and Exotic objects.

If the is contractor carried out drilling bottom level is lower of the design it must be attributed to the contractor to fill drilling regular concrete even be attributed to the required drilling expenses in excess, then filled with normal concrete until the alleged design at the expense of the contractor if not stated otherwise on the graphics.

You must drill a temporary basis results are placed away from the trenches and in a way to avoid them having to move it again, and so does not hinder the continuation of work as an organization - are not allowed to put the drilling Output on the side of trench category includes the transfer of redundant to public landfills up to date so that it does not follow the quantities the presence suspension of work.

The Contractor shall work all the necessary precautions and as it deems sufficient to prevent all notified fall into this trench or excavation work and the work needed to prevent traffic and lighting and protection it night and put red lights so that the distance between the lamp and the other of not more than ten meters be to indicate the presence of danger in that region.

Contractor accountable absolute for any impact or damage to affect any part of the business, whether permanent or temporary, or any of the neighboring property, whether owned by the competent or another destination, whether due to carry out drilling or how to act in the result - which is solely responsible for any slippage or damage get to work and neighboring property and must repair any damage like this on his own account to take all necessary action to prevent slipping. Excavation work - digging all kinds of different layers of earth that appear during the process of drilling whatever type and nature, whether muddy ground

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or sand or buildings or reinforcing concrete and rocks that might hinder drilling include categories transport waste to public landfill, include a class drill - other expenses and equipment and machinery necessitated by the completion of work to the fullest full depth which is determined to reach elevations design is drilling and demolition waste and so on, which sees the competent authority validity of his property to them and to the contractor which store it and stack them in the workplace and maintain without any addition to its tender categories. Category also includes cut and the transfer of all the trees that hinder buildings as well as the ways in which order the cutting off direct Engineer for implementation.

10.1.2 Backfill work

The backfill with clean soil of the output of drilling or clean sand if so provided in the drawings, according to the levels approved the layers per thickness of 0.25 m with water flooding and pounded well and is gradually filling with work .

May not allowable to backfill the dust around the buildings or grounds - whether This construction may have or have not done only after obtaining the promotion of direct Engineer for implementation.

backfill measured and considered cubic meter of vacuum filled from the reality of the net space required backfilling as described drawings and instructions that given to the contractor during the course of work in the vertical rise to the level of the Earth's natural and does not pay any additional amount for backfill that is outside these limits.

In all cases the backfill with clean soil and free from residues of buildings or organic materials such as grass or tree roots or top layer of agricultural land and mineral substances removable steel or decomposition or calcareous materials and compact layers of backfill to get the required density, according to one of the following executive ways :

10.1.2.1 Backfill with sand

If the required backfilling spaces located inside buildings so backfill surface are compacting using a vibrator that the number of tremors which it does in the range of 1500 pulse / min and compact each layer is 15 cm for a period of not less than 3 three minutes.

If the required filled in spaces outside the buildings are compaction layers of backfill using normal Heras, which weighs 3 tons on the number of compacting be not be less than each layer (25 cm) about 10-12 times or weighs 5 tons, but not less than the number of compact each layer 8-10 time making sure that the number of compaction built above given ratio ideal compaction required.

10.2 Concrete and reinforced work

10.2.1 General

10.2.1.1 Work boundary

This chapter specializes specifications regular and reinforced concrete work necessary for the implementation of all the elements shown in the drawings

10.2.1.2 References

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- Egyptian code for the design and implementation of reinforced concrete structures of the Ministry of Housing and annex Ministerial Decree No. 98 of 2001.
- Specifications concrete work items and reinforced concrete issued by the Ministry of Housing and annex Ministerial Decree No. 206 of 1995.
- Concrete Code No. 2002-203 laboratory experiments guide.
- Specifications standards Egyptian (S.S.E).
- The materials used in concrete subject to the following specification work:
 - S.S.E. 534 metal wrenches.
 - S.S.E. 373 normal fast-hardening cement and Portland cement.
 - S.S.E. 583 Portland cement sulfate-resistant.
 - S.S.E. 1109 concrete aggregate from natural sources.
 - S.S.E. 262 steel bars for concrete reinforcement.
 - S.S.E. 1618 mesh welded steel bars for concrete reinforcement.
 - S.S.E. 1658 concrete tests.
- Part 1: method of taking fresh concrete samples at the site.
- Part 2: method of appointment of the landing of fresh concrete value.
- Part 3: Method for determination of compaction of fresh concrete worker.
- Part 4: the modus operandi of the test cylinders of fresh concrete.
- Part 5: the modus operandi of the test cubes of fresh concrete.
- Part 6: Set concrete resistance to pressure in a way the heart of the concrete test.
- Part 7: Regular processing of samples test method.
- S.S.E. 1899 concrete additions - Addition of water and diluted additions accelerated to doubt and additions to the rear doubt.

The data required from the contractor

- Operating fees

The Contractor shall provide drawing of the project explaining the all sizes and breaks casting and details of reinforcement bars prepared in coordination with the rest of the mechanical and electrical business requirements and submitted by the contractor to engineer supervisor for review and approval before the start of implementation no later than fourteen days.

For Precast Concrete is working drawings prepared by or under the supervision of a qualified engineer and a specialist in this kind of business and facility with graphics calculations include a memorandum accounts and the foundations of the design in all load conditions by adding, as a minimum - the following:

installation and dimensions of each unit include members and sectors lengths and the size and type of reinforcement.

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- The work program

Advanced Contractor program to work in the concrete works before the start of implementation no later than fourteen days explaining the work sequence succession and the supply materials and delivery dates and all that is needed to finish.

- Testing materials

Advance contractor with the names of the places that will perform quality control tests on reinforced concrete materials to the engineer for approval.

- Samples of materials

contractor make samples of all materials used in concrete work to supervisor for review and approval prior to the commencement of work seven days.

Advancing the contractor during the implementation phases of the project requests a review of the implementation phases of the concrete work includes the required data according to item (3-1) items (e) and insulation at any stage begin only after the approved of the previous carry-over and in accordance with the instructions of the supervising engineer and after casting reinforcing the project progresses Contractor report on test results of concrete cubes according to specifications.

- Mixture design

Contractor advanced design mixtures of various grades of concrete to be certified by the design laboratory approved by the Engineer and submit the results of laboratory tests on the experimental mixtures which has the approval of the supervising engineer.

- Measuring station and mixes

If the contractor decided to use central mixing stations must progress the full details of the methods proposed to mix and transport concrete for approval supervising engineer.

10.2.2 Quality Control

Conduct initial and periodic tests of the materials of concrete and concrete ended according to the rules contained in Part 8 of the Egyptian CODE No. 203 of 2001.

It is resisting pressure for concrete test Hardened per your repetition on casting or per Fifty cubic meter, whichever is less for each type of concrete used types.

Prefabricated concrete mixing off-site. In the case of concrete in the processing unit for the manufacture of the project site must be sent out with each mix certificate indicating the:

1. Mixing ratios components including any extras.
2. Mixing and strength of concrete and rank time.

10.2.3 Environmental conditions

Not allowed to work in pouring concrete or mixed in the case of low temperature of zero c or if temperature more than 40 c in the workplace.

Casting stop work immediately if the worsened weather conditions (such as rain or the presence of a storm or a dusty atmosphere), which can affect the concrete either before or after the cast

10.2.4 Delivery and Storage

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Materials used to be from the finest Egyptian conformity with the standard specifications species and in accordance with the approved samples from Engineer before delivery.

Supplying various materials to the site sufficient quantities needed to implement the actions required at each stage of the work and quantities allow continuing implementation without business disabled.

10.2.5 Storing material

10.2.5.1 Cement

It must be protected in a way they inform cement effective protection against rain and moisture the air, land and should not be used in any concrete cement began composed by solid blocks or granules or appeared by impurities or been on storage for more than three months.

10.2.5.2 Aggregate

Must storing small and large aggregates of the individual and how to avoid pollution that need special concrete or high rank must work a solid platform for storing aggregates by the different sizes according to the desired particle include it.

10.3 The materials

10.3.1 Aggregate

Aggregates shall be in conformity with the Egyptian standard specifications No. 1109 and to be gradual and clean and free from dust and shells and alkaline materials and organic and the clay and salts of iron and other harmful substances and be in conformity with the required tests. We must supply the gravel and sand of the individual and to be the largest legal size large aggregate of the user, as shown in Table 1 and the sand must be sharp angles and graded granules.

10.3.2 Cement

Using Ordinary Portland Cement or fast cement hardening corresponding to the Egyptian standard specifications No. 373, as well as sulphate resistant- sulfate cement to the Egyptian standard specifications for No. 583 be inside sacks closed in batches as needed and may be used in the cement of others filled of concrete in the case of the use of mixing stations centralized and may be used in the regular Iron cement concrete.

10.3.3 Water

Water should be used in the concrete mixing clean, free from harmful substances like oil, acids, alkalis, salts and organic materials and be safe drinking water source.

10.3.4 Additions

Additives used in concrete work should be matching the Egyptian standard specifications be 1899 and must not have a detrimental effect on the concrete or reinforced components and generally do not allow the use of additives by providing technical catalogs and the approved of the supervising engineer.

10.3.5 Reinforcement

The reinforcement user types of solid is normal stress flexibility not less than 2,400 kg / cm² or high-resistance steel stress undergo at least 4200 kg / cm² identical Egyptian Standard No. 262 specifications

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and diameters and lengths and dimensions shown on the drawings and should bars be free of any kind of material that reduces the cohesion between them and the concrete components such as peel or rust and grease must be cleaned before use bars directly.

store iron in the workplace on a regular basis and to protect iron from buckling and damage and should not they inform iron on both soil directly and must but bed of concrete, rising stacks bars by no less than 15 cm and the protection of iron from rust or influence by the salts in soil.

10.3.6 Concrete mixing ratios

Before work began Contractor shall conduct primary tests on concrete cubes to prove that the results of stress tests check safety margin in the range of value contained in the Egyptian Code increase the value of the stress characteristic of concrete mentioned drawings In the case of different contractor must change the mixing ratios and re-tests.

The minimum content of cement per cubic meter of concrete mix as shown in Table (1) (unless stated drawings of the project):

Must be the formation of a number (12) of twelve cubic of each batch to be six test cubes after 7 days and six cubes after 28 days and depends mix design if the following conditions are met:

Average compressive strength after 28 days for three consecutive blends have the same ingredients over the resistance characteristic value by 65 kg / cm² .

Must not be less resistance cubic any single characteristic value for the resistance.

No more than the difference between the biggest resistance to the cube and the smallest in the one on the test 15% of the average of this test can be the supervisor of the engineer that the building of the mix depends test results after 7 days, provided that these results less than 80% of the required resistance after 28 days.

Concrete type	larger diameter for aggregate (mm)	Minimum amount of cement (kg)	Maximum water cement ratio by (weight)	Special concrete resistance after 28 days
Ordinary concrete	38	250	0.55	150
Reinforced concrete	19	300	0.45	250
Concrete water installations and concrete floors exposed	19	400	0.45	300

And so that at least the stress characteristic of what is mentioned concrete construction drawings and cement can reduce the proportion of what is mentioned in the case of using a central mixing stations or additions reduce the proportion of water to the contractor to submit the results of stress tests that demonstrate the achievement of the required mixing of stress ratios.

The precast concrete design mixes with an average stress fracture of at least 300 kg / cm² after 28 days and cement ratio of not less than 400 kg / m³ unless otherwise specified drawings and bills of quantities .

(E) ordinary concrete surfaces to the tendencies of the kind of foam and weighing more than 1200 kg / m³ and the components are set in accordance with the instructions of the manufacturer to add foam.

In the case of concrete used in the construction of water reservoirs or the like must be addressed additions prevention waste water such as adding Blasto Crete (N) Sika production company.

All calibrated reinforced concrete products by weight in a central mixing plants with the exception of small quantities can be size calibration mixtures in small volumes by the supervising engineer's instructions.

10.3.7 Water stops

Strips of PCV compatible with British Standards BS 2571-BS 278 have a width not less than 25-centimeter effective thickness of at least 6 millimeters and able to withstand water column pressure, up 15 m (such as Sika Water senior) and use the model (M-35) for walls chock and foundations and model (D-20E) in other places.

10.3.8 spacers concrete flooring filler material

Fill breaks down the injection material Joint Filler using polystyrene periods density of not less than 36 kg / m³ and is used to adjust the thickness of the injection material rod spacers made of polyethylene compact stuffing diameter suitable to display the interval .

Material injection interval joint sealant be self-settlement-based polyurethane Aorthian like substance Seca Flex.

10.3.9 Concrete reinforcement fibers

Made of poly Poplin material in the form of strips according to the specifications of the American Institute of Concrete No. ACI 544.

10.3.10 Addition prevent corrosion of concrete surfaces for floors exposed

Dealing with concrete surfaces drifting prefabricated metal such as (Habdor Premix) at a rate of at least 5 kg per square meter and color required by the supervising engineer's instructions.

10.3.11 Casting molds for concrete precast

Contractor fully responsible for the design templates and he has to ensure that there was no change in the shape of the mold or part of it or its collapse during any stage of work until the jaw ending process and the formation of concrete elements as stated in the drawings.

Reinforced concrete elements required phenomenon that surfaces be completely smooth (fair face) and with homogeneous color and must be implemented in accordance with the following:

- 1-Eexplosive and metal molds used approved by the Engineer.
- 2- Clean the surfaces of molds and templates well before re-use and still no traces of concrete or cement to the rest of them.

10.4 implementation

10.4.1 General

All the conditions set in Egyptian CODE applied to the design and implementation of reinforced concrete structures.

The Contractor shall cooperate with the health, electrical contractors and others for what will be a combination of them into the concrete with the provision of cans and chopping necessary to do so within the concrete and not to pour concrete before the completion of the installation and inspection and testing have buried them in concrete.

Before starting the implementation should check the axes and size of all the columns built drawings and verify compliance on the ground.

Must connect all the walls of adjacent buildings columns by bars no more than a diameter of 8 mm or wicker of galvanized iron size 25 * 2 mm length of 25 cm are placed every 50 cm length of at least 10 cm within the columns before the cast and installed during construction in Arames neighboring walls.

No contractor may start casting before the engineer to review and adopt the following items:

1. Materials used.
2. The final level that concrete will be casting.
3. Types of wrenches.
4. Details and dimensions of reinforcement bars.
5. Places casting method implemented breaks.
6. Locations and sizes of buried concrete elements within.
7. Precautions for casting in unusual atmosphere.
8. Casting reserves down water levels.
9. Concrete testing rates and experience required.
10. Concrete program.

10.4.2 wrenches and chopping

10.4.2.1 Installation

Must be installed intensities and chop reinforced concrete way that ensures perfectly constant survival throughout the period of reinforced concrete casting and during the period of hardened as aspects of chopping be a court so as to prevent mortar leak to the outside and must be based supervising engineer to receive chopping and wrenches before compaction rebar, taking into account to allow mentioned limits Egyptian CODE for the design and implementation of reinforced concrete structures.

Must take actions wrenches and chopping so that they are strong and sturdy enough to withstand the fresh concrete pressure and weight and live loads without twisting or shifting and must be taken into account in the method used to pour concrete and compacted and the effect of pressure and vibrations along the chopping and wrenches.

Must focus menus on fixed rules fit with the reality of period and should continue through the necessary menus bottom roles of the role of the ongoing work done so based on the ground bear loads located them safely.

In the case of the use of chop or intensities of a special nature must be carried out according to drawings and designs, which are for this purpose, taking into account the need to use intensities metal works with exact dimensions such as sewage water discharge excess.

In the concrete business, which leaves the final and visible surface should be wrenches and bottles of a new timber in the form approved by the supervising engineer prior to implementation and must assemble improvised explosive way collected so that the panels grouped together in a manner clicking and tongue and to be a surface adjacent to the concrete flat, smooth and swabbed panels (or without survey to show the character of wood fiber by the supervising engineer).

If you want to get on the surfaces of soft flat perfectly permissible to use intensities and packages of metal to be the surface of the sheet metal contiguity concrete flat, smooth and free of protrusions and the metal panels of the explosive assembly welding way or cut metal assembly to get on surfaces soft required.

10.4.2.2 Removing the chopping and wrenches

Air temperature and span and the load that would allowed and the type of cement affect determine how long time between the formwork and dismantling of chopping and wrenches and must ensure that the cubic resistance of concrete time enough to withstand the stresses which would be removing the wrenches.

Be guided by the following values when you remove the chopping and wrenches for normal work in normal temperature.

1. If using ordinary Portland cement

You can usually remove chop sides which serve as just the cover of concrete after 24 hours .May not be decoding chopping and wrenches-bearing beams and slabs before the expiration of a period equal to the twice length of the span in meters added on to that two days with a minimum of seven days at the expense of the removing time for slabs is the span is a smaller length of the slab.

In the case of cantilever is the period required before removing the intensity equal to four times cantilever plus meters to two days with a minimum of seven days.

2. In the case of the use of Portland cement rapid hardening

Duration shall be according to the type of cement user does not in any way less than half the period mentioned in the case of using ordinary Portland cement.

Must be cautious and postpone decoding chopping and wrenches for an appropriate period in cases where the temperature drops about 15 degrees Celsius.

10.4.2.3 Special precautions

In special cases, such as the inverted beams and suspended roofs by columns begin tightening duration calculated to decode wrenches date pour inverted beams and ceiling molding or rack for suspended roof.

When unscrewing the chopping and wrenches full diligence not reinforced concrete seismic shocks.

10.4.3 Mixing and casting and compaction work

Supplying all the materials required for the reinforced concrete from a central mixers and material which is calibrated by weight and mixtures supported the supervising engineer.

In the case of the site must be confused by mechanical mixing concrete mixers are not allowed manual mixing except in special cases and in small amounts and with the permission of supervisor engineer.

It must not be less than a period of confusion for one minute the mixture amounting to 1 cubic meter or less after placing all materials into the mixer by 15 seconds per cubic meter increase or of it on part confused period of not less than one minute $\frac{3}{4}$ of the end of the mixing water status are not allowed to add any water Concrete mixing that goes on the more than thirty minutes.

Take into account that the concrete is moved from one place to confuse the position of casting means to prevent separation of the granular rubble in the horizontal case: the use of gutter must be metal and slope least 1 horizontal:3 vertical.

Take into account that the concrete layers pour each layer in the range of 25 cm, especially in the beams and the concrete walls and so can compact concrete.

Should compact concrete using mechanical means such as immersion or rocking rocking surface be performed by a trained person with the following in mind:

Stop compaction after the completion of the appearance of air bubbles.

Do not touch the internal vibrators for rebar during compaction.

Takes into account the formwork and compacted in the previous destabilize not cause cast concrete or rebar budge even spaces do not consist in concrete reinforcement or on skewers.

-Are not allowed the use of sea water in the concrete casting is not allowed to pour any reinforcing in the presence of ground water should be provided with means to ensure drying casting place before and during the pouring of concrete for 24 hours after completion of the cast .

10.4.3.1 Casting breaks

Take into account when making casting precautions breaks the following terms and conditions:

That the spacers are in the beams and slabs at minimum values sites for shear forces as much as possible or at the point moments neighboring coup substrates.

Must be a separation perpendicular to the strong internal influence.

Spacers between the work deep beams and slabs inverted or related sites when this contact taking into account the casting hatchets, if any, with the tiles.

When you resume casting horizontal spacers (after more than a day) carved concrete surface well to show the great aggregate then clean the surface so still remains bulk material and then wash with water until saturation and sprinkle a layer of cement. Paints or increase cohesion between the old and new concrete.

In reinforcing water installations is implementing water-proof installed in the casting tapes of the entry into force of the water breaks the water stops in places with too much work to install them well according to details and should compact concrete well around to ensure that there are no spaces or pores around.

10.4.4 Prevention and treatment of concrete

Must modern casting concrete rapid processing of rain and drought, so covered in blankets occasion of the end of the pouring of concrete to the time when it becomes hard enough to the surface so that they can shop with water and coverage of material moist.

Concrete must be processed at a temperature not lower than 10 degrees Celsius in wet condition altogether for periods of not less than:

- Seven days in the case of using ordinary Portland cement.
- Five days in the case of the use of fast-hardening cement, or in the case of the use of processing additives.
- In the case of non-wet processing allows followers using an approved treatment compounds are sprayed mechanically according to the instructions of the manufacturer.

You must protect concrete surfaces which would leave open without Conch or cladding carefully during the implementation of other actions and that covered Kraft paper sheeting or non-impermeable to water or

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in the manner approved by the supervising engineer to keep clean surfaces and edges intact without any cracking or damage.

Water must be used in the work of processing clean free of salts and harmful impurities and is not permitted to use seawater in concrete curing.

If the surfaces or edges of a concrete phenomenon to any damage or cracks, it is processed by the method approved by the supervisor and the contractor.

10.4.5 Reinforcement

10.4.5.1 Cleaning

It should be cleaned reinforcement bars resulting from the manufacturing and non-coherent rust and oil, grease or any harmful substances before the pouring of concrete directly.

10.4.5.2 Bending

You should not bend the bars or modified in a way harmful to their properties or resistance, and authorized by discouraging hot to the point of irritation does not exceed start gradually and leave to cool in the air and does not allow the sudden cooling of the skewers with water.

10.4.5.3 Concrete cover to reinforcement

The thickness of the concrete cover must be set forth in the following table values considered as measured from the outer surface of the skewers or stirrups (if any) to the outer surface, as a minimum (unless otherwise stated drawings).

Part of structure	Internal installations that are not exposed directly to atmospheric effects	Foreign enterprises directly exposed to atmospheric effects
slabs	1.50 cm	2 cm
Beams and Columns	2.50 cm	3 cm
Foundations and retaining walls	-	4 cm

And the concrete work is not protected and in front of the Confrontation of landfill must be concrete cover at least four centimeters.

And in any case, must not be less than the cap for diameter of skewer the biggest user.

Monitoring of reinforcement.

Performs opportunities rebar in chopping according to a graphics operation approved by the supervising engineer to be installed on the chairs rates allow non Budge during the casting or because workers by the movement, also saves cover the concrete using plastic parts or concrete distribution rates regularly in all the intensity area, and take into account connect all stirrups in the iron main armament top and bottom and stretch all the electricity pipes and prove pieces buried by mechanical and electrical drawings and all of the delivery business to engineer supervisor for review and approval before the start of the casting.

10.4.6 Periodic tests

Place pressure on the concrete that are executed at a rate of one test per day for each casting or 50 m³ of concrete carried out tests, whichever is less.

Samples taken from places pouring concrete from different places, and samples prepared in accordance with the Egyptian standard specifications.

Test on the casting includes six blocks, three of which are tested after 7 days and the other three after 28 days.

Must cubes numbering and recording the place and date of each sample taken from him and casting the results of tests for each group and kept with the project engineer.

Results are considered acceptable if the tests check the following:

1. Not less than any test by more than 15% of the special concrete resistance.
2. Average three cubes by more than 15% of the special concrete resistance testing should not exceed.
3. In the case of the success of the test experiments after 7 days can sufficiency and the lack of testing after 28 days and that, as the accepted value of compressive strength after 7 days is 80% of the special concrete resistance.

In the case of the failure of the test results after 28 days must be taken about what it takes to prove the quality of concrete implemented by the concrete heart tests or download or both as requested by Supervisor Engineer or remove the concrete that have been implemented.

10.4.7 Connecting the old concrete with new

Remove layers of conch and cleans the surface of the concrete well.

Put links to link the old concrete with new concrete in specific places in drawings action holes' diameter increases by about 2 mm diameter Links and deep enough to be installed in the range of 5: 7 times diameter.

Clean the holes well compressed air then fill material with chem-epoxy 165 and grown Links taking into account the location of the signal to be enough length to connect them with concrete emerging.

Old concrete surfaces are painted with his provisions polymer such as: joint grout Super aladibont 65 (modern construction chemicals company) before pouring concrete emerging as instructed by the manufacturer to ensure the contiguity of the old concrete with the new concrete.

10.4.8 Precast concrete

Contractor is responsible for supplying all of the elements and materials and buried parts of concrete like lifting screws and link between the units and elements of origin and in accordance with the Executive drawings approved by the engineer and take into account to be confused with components from the same source that has been samples of it to maintain the appearance outside and work Figure architectural surfaces phenomenon for all units.

Concrete units manufactured in the workshop and are not transported to the place of installation only after at least 14 days from the date of casting to be treated with water for a period of not less than 7 days of heavy water spray.

The movement of the units to the place of installation way that does not lead to an increase jurisprudence, located as it is lifted by cranes to the specific places, according to what is shown in the drawings and prove

their Joat the use of galvanized steel processor against rust or reted on a cushion of rubber neoprene. Must ensure congruence horizontal and vertical joints between prefabricated and places of installed units.

Tolerances - could allow the following abuses:

1. Thickness - 3 mm or 6 mm
2. Overtaking allowed in dimensions ± 1.5 mm / 15:00

10.4.9 Foam concrete

Foam concrete from a mixture of cement and water plus the material consists of foam formation. And it is confused mechanical mixer in the workplace and determine the duration of mixing chemical additives depending on the material. Mixing materials ratios as determined by density and pressure resistance g thermal conductivity is required and the resulting material has a high coefficient of susceptibility contraction.

10.4.10 Concrete reinforcement fibers

It is mixed with concrete components at a rate of at least 0.90 kg / cubic meters of concrete for distribution within the concrete regularly in all directions composed additional strengthening against cracks caused by shrinkage during the process of the doubt.

10.4.11 Concrete phenomenon of floors and ramps

Be concrete paving cement content of at least 400 kg plain Portland cement per cubic meter and the thickness of this layer after compacting and settled according to the drawings and must not be less than the resistance of concrete to pressure from 300 kg/cm² after 28 days, and the armature of the previous processing networks and amended at least 8 mm diameter skewers every 20 cm in both directions or as indicated on the drawings.

You must serve the topmost layer of polyethylene thickness of 300 microns' concrete chips after compacting and ground settlement well.

Side of the sectors of molds and metal panels composed so that at least plate thickness 6 mm and is installed chopping in place on the elevations required drawings must chopping based full length well, based to withstand vibrations that would be exposed and must not happen by deflection more than 3 mm If marbling increased molds it must stop working and re-chopping to the correct levels also must be based contractor to bring length enough from chopping so that at least the required length of the two-day work and take into account before installing chopping in place duration of 12 hours painted material to prevent adhesion of concrete roofs to be drought that article before the start of the pouring of concrete.

Reinforcement is necessary for the installation of separators in accordance with the drawings shown with the executive to ensure that the sites by relegating during the casting of concrete and compacting.

Concrete is poured in a longitudinal slab slides every single chip and reciprocal manner which is poured slides 1.3 numbers 0.5 and after the end of intransigence and chopping their own decoder is poured slides numbers 2, 4, 6 and so on.

Carpeted with the first layer of concrete once placed inside chopping and are distributed and compacted and settled by mechanical thickness of less so after finishing compaction process by 5 cm from final thickness.

Compact rebar clasped top of the first layer mentioned above in accordance with the diameters and distances shown on the drawings so that this is done before the expiration of 30 minutes of the first layer brushes.

Carpeted second layer top of the first layer and before the expiration of 30 minutes of furnished and are shaken and settle its surface using Akaddh and rocking suitable length so that it moves on the side of both chopping.

After hardening of the concrete surface to the extent permitted to bear the weight of mechanical machinery for the settlement of the concrete surface shall be settled by machinery and mechanical adjustment to ensure you get served on a flat surface and so as not to exceed the tolerances ratios.

Treated concrete surface with spray materials for the treatment of surfaces. Not allowed to walk on the surface of the concrete after finishing and settled before the expiration of two days from the time of casting River.

Are not chopping only after the expiration of 12 hours of pouring concrete and take into account the full attention when you remove the chopping even cracking characters' concrete, any nesting concrete adjacent to the frame is processed after decoding chopping using a mortar consisting Sand of cement and two parts of sand and that part after the cement does not happen Preview of the Engineer and obtained his approval to carry out this treatment.

10.4.11.1 Ratios specified tolerances, concrete floors Area:

And it is intended to increase the allowable attributed teams and be 3 mm in Distance 3 meters and measured after casting concrete one day.

10.4.11.2 Floors breaks

1. Be of material filling soft and be able for the cast in the joints easily and freezes in normal temperatures throughout the year and are not affected by the sudden change in temperature so as not to crack or crumble and be good pasted surfaces and impermeable to water and depends this samples before implementation.
2. Isolation Joint: (Isolation Joints) Work when correspond to concrete any walls, floors or rules or beams ground and extends the full thickness of the tile and implemented that is placed during the pouring of concrete in exchange for the walls and the rules and the floor beams, slabs of compressible such as wood particle Saturated material bitumen with Thickness shown on the drawings and, up less than Height Depth interval by rising material filling
3. The implementation of all the commas and longitudinal spin-off, according to the executive drawings and technical specifications and dimensions and sizes and described them in their designated places.
4. The implementation of all the commas longitudinal parallel to the Face of the building - The spin-off shall be vertical separators and spacers must all be in the straight and perpendicular lines.
5. All reinforcement bars user be in the spacers diameters and lengths and spaces in accordance with the drawings shown and proven executive in the middle of the thickness of the slabs, and must be perpendicular to the surface of the chopping and must remain fixed in place during the process of pouring concrete.
6. (Contraction Joints): Action deflation breaks the concrete surface by mechanical cutting your chainsaw and so the distances set out graphics note that the publishing process does not begin until after 8 hours of the end of the molding, in all cases, must arm the separator material filling spacers.
7. (Expansion Joints): Expansion joints operate every 50 meters in length and extends the full thickness of the slab and 2 cm wide and before pouring concrete slab is placed to fill the entire

thickness of the tile spacers, except 3 cm from the top level of the tile joints are filled with filler material.

10.4.12 Weak concrete

Using weak concrete to fill in the vacuums resulting from the increased drilling volumes bottom floors or to install aspects of drilling or any other purpose as required drawings and instructions of the supervising engineer, concrete made from a mixture of rubble and gravel and cement by 1 cubic gravel to half a cubic meter of sand is added 100 kg cement to them, and it can be calibrated material size and mixed manually or mechanically.

10.4.13 Install water stop

According to the instructions of the manufacturer are installed steeplechase water stop in the casting breaks in the middle of the thickness of the slab or the bottom approved by the supervising engineer and model in accordance with the drawings.

Contraindications used water stop in all expansion joints below the Earth's surface and in water tanks, also need to be used when casting and breaks in water tanks.

Article (1/3) ordinary concrete of sand and gravel and cement:

Cubic meter: Supply and work normal concrete foundations and movers territory made up and the succession of mortar least stress Cube break her after 28 days from 180 kg / cm² and Category comprehensive supply, mixing and casting and all necessary chop and otherwise by industry assets.

Article (2/3) ordinary concrete for slope surfaces:

Flat Surface: Normal concrete action tendencies surfaces thickness average 7 cm and not less than 3 cm of three break bricks parts of clay passes rocker eyes 3 cm capacity and a two-part mortar composed of two parts off Gear and three sand Parts, 100 kg cement per cubic meter mixed.

Article (3/3) normal concrete break bricks for floors bathroom:

Cubic meter: normal concrete floor bathroom by 0.8 m³ brick break clay by passes rocker capacity eyes 3 cm, 0.4 m³ sand, 150 kg cement required in the tables of categories and the final settlement of the surface horizontally or diagonally on demand.

Article (4/3) Concrete Dahshom dry:

Supply and threw concrete Dahshom dry and the Dahshom to be at least a diameter of about 6 cm thrown dry by hand and fill in the blanks that appear after that mortar cement and sand by 300 kg cement per cubic meter of sand with well-pounded Moundalh.

Article (5/3) reinforced concrete for foundations with Portland cement:

Cubic meter: Reinforced concrete for foundations includes bases and smells and columns until the level of insulation layer horizontal cement content of at least 350 kg/m³ cement.

Article (6/3) reinforced concrete for slabs:

Flat Surface: Cement content of not less than 350 kg / m³ and category comprehensive processing of the land underneath the site and sprinkled hygiene thickness of 50 mm and all the necessary frame and breaks and arming and otherwise by industry assets.

Article (7/3) reinforced concrete for main structure and ceilings of concrete and hangars, etc:

In cubic meters: Reinforced concrete for the main structure and include trusses, stairs, thresholds and succession mortar with cement content of at least 350 kg cement / m³ and category comprehensive supply and mixing, molding, all the necessary arming and chop and otherwise by industry assets.

Article (8/3) reinforced concrete Water Works:

Cube Surface: Reinforced Concrete (Fair Face) for Water Works of cabinets and walls and so on floors with the use of seka material or Albarablast or similar mortar with cement content of at least 400 kg cement / m³ and category comprehensive supply and mixing, molding, armament and chopping and otherwise by industry assets.

Article (9/3) reinforced concrete soft surface (Fair Face):

Flat Surface: Additional addition to the reinforced concrete structures of concrete acts of the prices match the work of a private wooden containers and intensities or (equipment), as the case by using a new timber or scanned for a final flat surface to be left concrete surfaces without the phenomenon of conch. These include the premium and all that is needed to maintain the concrete that is poured and maintained throughout the period of implementation of the other business is cleaning and washing the surfaces upon receipt Offer no use is this kind of reinforced concrete structures of concrete only after the approval of the supervising engineer.

Article (10/3) separators in reinforced concrete work:

Construction Joints

It is those spacers which are used to split the building into smaller units commensurate with the ability of the site to produce and pour concrete and determine their places by the designer Engineer or Contractor and shall be selected to be in places where there are fewer stresses, particularly shear stresses and not affect the durability of origin.

And take into account the following conditions and have the following precautions when performing the commas:

The spacers are in beams and slabs at minimum values for shear forces sites as much as possible or when neighboring points moments coup pillars. The separation must be perpendicular with the internal forces affecting.

Spacers between the work deep beams and slabs inverted or related sites when this connection taking into account the casting cutting tiles if found with slabs. Preferably Engineer predetermined port casting breaks on the executive boards taking into account the clarification of iron reinforcement necessary to transfer tensile and shear forces at key intervals so as to the possibility of submission to the design engineer if necessary.

When you resume casting horizontal spacers (after more than a day) sculpts the surface of concrete rubble good to show a lot and then clean the surface until the remains are still the bulk material and then wash with water until saturation and sprinkle a layer of cement or paints greater coherence between the old and new concrete. We can work together for concrete pouring first using nets stretched to get a rough surface and at the same time allows the passage of reinforcing steel during the shell.

Shrinkage Joints

These spacers are working to avoid cracks caused by concrete shrinkage in large surfaces such as floors, walls, water tanks and Basements are in this case pour concrete on the spaced parts or leave offer enough (slice contraction) between the mentioned parts, preferably provided with the keys on the sides of the concrete is poured remaining parts or This sewage treatment and after dry parts that were cast first, taking into account conditions and precautions contained in the preceding item breaks for casting .

In the case of the vast spaces that require action shrinkage breaks to avoid cracks divide those bodies to a group of parts does not exceed the greater after the 25 meters and then pour first individual or marital parts and after at least a week to be completed mutually Other parts molding with work breaks between individual spaces marital width of 2 cm at least fill after casting bitumen or any similar material. And it may be full of large surfaces and floors casting at once, provided you follow the same previous steps and work flexible joints between the concrete sections allow freedom of movement in these parts.

Movement Joints

These spacers are working to contain any volumetric changes in the concrete caused by temperature difference or concrete shrinkage or vertical movement because of the different loads density per building and the different parts of incorporation quality. These spacers and allow the movement of parts of the building and prevent any formations or undesirable interpretations can arise from preventing this movement.

Attention must be paid to the implementation of these intervals so as not to be a source of leakage of water or fluids during the relative movement of parts of the separation is to locate these interludes by the design engineer and in accordance with the drawings and the detailed specifications own and taking into account that the conditions and the following precautions when performing these intervals:

From 40 to 45 meters in the temperate zones.

From 30 to 35 meters in warm regions.

And it can be allowed to increase these distances provided taking into account the design effect when the expansion and contraction and creep factors. In the case of mass business and retaining walls must be arranged at intervals less distances.

10.5 Layers and insulating materials

10.5.1 Types of insulation

10.5.1.1 General

The materials used in the implementation of the buffer layers are of the finest works of modern species and the corresponding technical specifications mentioned various materials, the corresponding samples approved by the competent authority before supply.

Supplying various materials to the operation site in sufficient quantities needed to implement the actions required at each stage of the work by the executive program. Calendar quantities allow continuing implementation without disrupting the implementation of other works. Take into account the storage of materials to preventing them from damage and exposure to the weather, the storage insulation inside the dry store a continuous ventilation and is not exposed to the direct heat of the sun

Cement: cement used in the implementation of the Aldkat or whiteness or construction of the normal type Portland, modern-made and the corresponding Egyptian standard specifications Ordinary Portland cement.

10.5.1.2 Water isolate with Bituminous

Insulation under the floor and the isolation of the external vertical surfaces of the water tank, and protected insulation layers of water protection using vertical or horizontal sheets direction, it needs to be done to concrete layer with thickness of 5 cm horizontal layer protection.

10.5.1.3 Water isolate using polyethylene



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Qalubeya
Governorate



Ministry of Housing,
Utilities & Urban Communities

Isolate concrete slabs cast over the backfill in the lower role of each building. This section is work to isolate the water using the paint layers in the liquid state on the cold and includes the following items:

Isolate foundations (foundations, smiles, and columns necks) using bituminous:

Isolated places floors in the building which using water on an ongoing basis, such as water courses using bituminous isolation. Isolate the inner surfaces of the tank water using a concrete foundation insulation. Water isolation with layers that cold painting:

Cold paint layers that used at liquid state to the following acts

- The removal of foundations (foundations, smiles, and columns necks) using bituminous insulation. accordance with the drawings.

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and



TENDER DOSSIER for D2-QAL2
Works of Side Streets Paving with Interlock Tiles and Canal
Covering & Landscaping in Bahry Sekka Hadid Area-Qlayoub –
Qalubeya Governorate
ملف مناقصة أعمال رصف الشوارع الداخلية ببلاط الانترلوك وتغطية قناة وتجميل المكان
بمنطقة بحري السكة الحديد بقلوب



Part B: Covered Canal Landscaping Specifications

Prepared by إعداد



and



TENDER DOSSIER for D2-QAL2
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1 SPECIAL CONDITIONS

Special conditions contained in the following paragraphs complement the general conditions of the contract.

1.1 Scope of works

The landscaping works for the covered canal consists of the hardscape, softscape and utilities for a small neighborhood park. It includes a playground for children, seating areas for families, walk ways ,library for general knowledge

1.2 General conditions for the project

1.2.1 Drawings and documents for implementation

1. The works is performed according to drawings submitted by the contractor consultant and approved by the supervisor and any drawings or details or instructions issued by them or by supervisor engineer considered to be within the original drawings attached to the contract.
2. The contractor should provide a time schedule for the implementation so on to be the total time of these actions within the prescribed time period for the implementation, the supervisor will review and approved this time schedule as it will be reviewed periodically to make sure you know the extent of the work progress. This should include a detailed program schedule for all project procurement programs.
3. The contractor should determine the times required for the work by the date of the contract matter.
4. The contractor should have submitted 3 copies of the standard specifications of the technical specifications.
5. The contractor should make pore holes on the line path to determine the kind of the soil and to report the soil investigation report.
6. The contractor should review the surveying works and make final shop drawings for review and approval.

1.2.2 Site Preparation

1. The contractor is responsible for the water supply source at its own costs that necessary to carry out the works.
2. The contractor providing electricity source on their own and at their own expense.
3. The contractor responsibility of delegates governorate engineer's office, construction supervisions engineer's office locations by water, lighting, communications and solely costs for all necessary connections.
4. The contractor should have implemented a visible large banner 3 m x 2 m shown the project name, the owner, the contractor, the designer consultant office, and the implementation period as well as a text that this project is financed by the European Union. It must be lit at night.
5. The contractor should facilitate the task of supervising engineer to monitor the progress of work, implementation and retain a full range of technical specifications and drawings for review and compliance on the work carried out.

6. Do not consider any obstructions in the site except for extraction permit a justification for the delay and must coordinate with the supervising authority and any other parties and construct confirmatory boring holes before starting the work.
7. The contractor engineer should be present in the work site permanently and continuously he must be an engineer in the Engineering association or more, intelligent, efficient, familiar with the work of planning, budgets, and all works subject of the contract. He must be authorized full authorization from the contractor to work on its behalf, as well as receiving instructions and orders.

1.2.3 Implementation

1. The contractor executing evokes all the tools, equipment, technicians and skilled workers needed to implement the works.
2. Supplying plants, shrubs, tiles and all special pieces required of all kinds only approved by supervisor.
3. The waste was transferred to the public landfill, as well as the removal of debris and excess dust and transported to public landfills and clean the sites up to date with the progress of the business.
4. The contractor should take all the engineering precautions during implementation and the obligation of the excavation width according to the Egyptian code which are considered in accounting it, qualities of the base layers, according to the longitudinal sections. Due to the nature lines path the contractor responsible for fully protect pipelines, especially in crossing under roads (if any).
5. The contractor should remove any works that deems supervising engineer contrary to the specifications or the assets of the industry at his own expense without any opposition. It must protect it from damage and climatic conditions and the reform of what happens to the work of the disadvantages for any reason, whether because of his workers or anyone else located in the site on its work responsibility.
6. The Contractor shall pave the way and remove any obstacles by his knowledge and at his own expense.
7. The contractor when it proceeds to the excavation work on the streets to maintain the work of other facilities that found from the water pipes, sewer, gas, oil and electric cables or lines of phones, which may appear during execution. And in the case of objections to the work it must connect with the construction supervision engineer to work from his part to modify the lines path according to the nature of the work or contact with the interests of government, authorities, and the competent companies to modify their works if necessary in this case, the adjustment costs are the responsibility of the water company and the contractor shall implement the instructions issued to him by the supervising engineer in this regard.
8. All remnants, currencies, and other value things that may be found during excavation, it must notify the supervising engineer to take what it takes to be delivered immediately to those who have authorized his receipt of the Antiquities Authority on behalf of the government and the contractor to take all necessary measures to prevent broken or lost or reserves damage to those things and the contractor must inform the nominee in the event of discovery of any cemetery, tombstone, fossils, remains of buildings, or any other remnants which are difficult to transfer and found during excavation in which case it shall be discontinued the works in this place until a further directive.
9. Quantities listed in the bill of quantities are estimated and the account will be on the really implemented on the nature.

10. The contractor has to reinstate things to their condition as pavement or otherwise for trench width with accordance to the drawings and full technical specifications.

2 TECHNICAL SPECIFICATIONS FOR THE PLANTING

2.1 Introduction

All specifications according to standard Egyptian specifications and the Egyptian Building Code.

2.2 Specific conditions of planting and the landscaping of the site requirements.

The description of the site landscaping and green areas is guided through illustrative drawings of the site are attached including the following: -

1. The transfer and planting (trees and shrubs) and install the various pillars and planting green areas by brushing soil and fertilization - in addition to the maintenance until provisional acceptance stage.
2. Determine the quality of the plants and site locations drawings for each landscaping area with schedules, explaining the various stages of the work.
3. Attached the names of key components of the elements of the proposed format for use in planting and landscaping.

2.3 The necessary guarantees.

Replace and change new plants instead of damaged one with the same quality and size, and so on a continuous basis and patrol and tinkering barren places that may appear in the landscaping and even the completion of a fully flat growth, repair any defected or damaged plants that may arise as a result of the agriculture business or optimization of the site during the cultivation when the replacement or substitution of any new plants damaged place or the weak with the same budget of the Contractor.

2.4 Delivery and storage and handling of the various elements of agriculture and afforestation

1. Make a list on delivery location on an ongoing basis indicating the type, quantity, size, weight and analyzes, as well as those elements must be saved from damage during storage after delivery from natural factors and others.
2. Avoid trees or bushes newly delivered movable or pinstripe before delivery, while avoiding causing any damage to the trunks of trees and shrubs delivered during transport avoiding the lose in their shape and aesthetic properties, with packaging trees properly during transport.
3. Do not move the trees and shrubs from one container to another container until planting project site.

2.5 The execution sequence of implementation in accordance with the technical specifications required

On the assigned work of agriculture, landscaping and green spaces make sure levelling off the ground and tendencies in general, and adjust water levels in accordance with the drawings, with fully remove any residues presented in the areas of agriculture, afforestation, while working to inform the supervising engineer for any infected plants, and the party the forestation and green spaces care to avoid injury to any public utilities of the project under or above ground, with the disclosure of digging by hand in advance if necessary to avoid any harm to any public utilities(water network tubes etc.) buried under the earth's surface. Nor is implement an advanced stage only after obtaining the approval of the supervising authority on the previous stage implementation.

1. Proper soil supply free of impurities and salts and after approval from the supervising engineer and stored in areas close to the workplace and according to the required operations.
2. PH for planting soil don't exceed 8
3. Supply of high quality manure from the good kind, and after approval stored quantities are required.
4. Appropriate soil quantities supplied for the trees, shrubs and plants mix farmyard manure by 3: 1 provided the presence of the supervising authority.
5. Locating holes trees, shrubs, ornamental plants and galaxies fences and flowerbeds and green spaces, the reality of paintings submitted and approved for implementation.
6. 5- Action (Gore) for the trees with dimensions of 0.7 m × 0.7 meter depth of 0.9 meter of the bushes 0.5 m × 0.5 m and a depth of 0.5 m (and the size of 0.125 cubic meters) Note: (must work to remove cuttings off-site)
7. Preparing and filling holes a and flowerbeds with soil mixture outfitted mentioned in item (4)
8. Submerge all holes with water and leave to dry.
9. . Brushes occasion of soil mixture according to the levels of plantation and the instructions of the supervising engineer, with levelling and dredging and soften the ground and then submerged and left to dry and then re-dredging and settlement.
10. the supply of trees according to the required types mentioned in the offer, but at least the height of the trees about 2m and the trunk diameter from 4 cm to 15 cm of the Earth's land surface, taking into account the unification of the size and shape of each quality of quarrelling supplied (in potted 20 to 25 cm) As for the length of shrubs shall be not less than (5 cm) and be placed in a suitable pot (15 cm) and with a crown and clear.
Note: trees, shrubs and plants supplied must be completely free of diseases, fungi and insects, and the total root and shoot in good health.
11. In the case of transplantation Deciduous trees in winter (mulch) must take care in all cases, with the total root, and taking into account the protection of different weather factors.

12. supplying bearings either missed or thick wood and a length of at least 2.5 meters in the case of trees, and 1.5 meters in the case of shrubs, and install the bracket with plants either way with ropes or wires must not be subjected to any case of plants to be damaged or damage.
13. planted trees and shrubs in the pits by distribution described in the approved paintings, taking in mind that agriculture is in the middle of injustice and then pressed the earth to install the seedlings and then tell profusely, then the brackets develop and connect the appropriate tapes, and to have it in the presence of party delegates supervision, We must plant trees and shrubs take into account the natural planting dates as much as possible.
14. The spray irrigation manually skilled workers a day until full composition of the flat green.
15. perform daily maintenance required operations until fully green lichen wholly the growth, after the first story with the care of trees and shrubs, ornamental plants and bring new plants instead of damaged or loss of them, and replanting barren places that may appear in the landscaping and even the completion of a fully flat growth.
16. On completion agriculture business and its success and completion of the entire landscaping growth can deliver the agriculture / gardening / landscaping sites to the owner first instance according to the terms of the contract.
17. Must be suitable to guard the parks plan does not happen until the loss or destruction of crops as a result of ill-treatment and use.

2.6 Maintenance

It is the most important agricultural operations to ensure the continued growth and success of cultivated plants and the coordination and the beauty of the gardens and of negligence in the care and maintenance on-going basis will be the fate of transplanted damage and deterioration of the gardens and the extinction of plants, so there must be in place a plan for maintenance of gardens and plants, starting from the date of receipt primary to coordinate the site for one year. Maintenance work is estimated at no less than 7% of the total business of plantings contained TORs requirements and specifications in accordance with the value set by the contractor own the item from the booklet, that acted on the value of an item of maintenance after the expiration of the maintenance, so administrative certificate from supervising engineer by the body to complete the maintenance process to the fullest, and to engineer supervisor freedom in traffic at any time to make sure to carry out maintenance work to the fullest, including maintenance presence of skilled gardens trained workers and their assistants as well as the materials needed to take actions care and maintenance processes and tools.

Care and maintenance activities include the following: -

1. Determine periods and quantities of water needed for irrigation for various plants, individually at each site of the project, and according to the quality of the components used in landscaping or agriculture.
2. The proposed method and deadlines to cut the marginal and pruning.

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3. Quality compost quantities and appointments with the of adding the needed amount for fertilization method.
4. Proposed methods and materials necessary and timely for the care of trees and plants and landscaping to prevent infections and curb the spread of pests and injury. And it shall mention the concentration of the spray solution according to each case.
5. Hoeing and aeration of the soil around the plants and landscaping elements provided.
6. List of equipment and tools necessary for the implementation of various care and maintenance processes.

A- Irrigation:

It is important not to deprive the plants in any mode, and also should not be wasteful in irrigation water and irrigated trees, shrubs and ornamental plants once every 2-3 days in the summer, and every 4-5 days in winter (depending on air temperature and wind speed) as irrigated landscaping in continuous spray, particularly after the agriculture directly and even germination of the roots, and then spray irrigation continue once every day or two in summer and once every three days of winter (it also depends on the weather).

B- Organic fertilization:

It is added at a rate of manure (Moktef) for each tree and each basin flowers once every six months (the first in mid-February to mid-March, and the second at the onset of winter in the month (equivalent Almoktef 0.2m³) approx.

C- chemifertilizer:

Normally superphosphate is added at a rate of 200 g per tree (insert after planting two months and then twice a year during the months of September and March) and nitrogen fertilizer is added at a rate of 100 g per 1 m² and added after each story.

D- Patching:

A month after the plantation being the removal of trees and plants and replacing damaged trees or new plants of the same type and specifications place and fastenings on a regular basis to maintain the integrity of the trees and landscaping are patching after 15.2.Day of agriculture after the emergence of germination roots being in the damaged places.

E- Shear marginal and pruning:

Is clipped green lawns for the first time after almost a month of Agriculture, Then once a week in summer and once every three weeks in winter, this is done by using proper mowing machines preferably mechanism (motorized) surfaces extensive and manual for small flats. And are marginal to the Parties that be unable mowing machines from accessing them, by the marginal private scissors and knife, and the pruning by pruning

scissors to remove the dry branches or unwanted, and that trees, shrubs and ornamental plants.

F- Hoeing and Scrabble:

Being in the soil around the trees and plants for ventilation and removal of exotic weeds.

G- Pest and disease resistance:

Are using the right kinds of pesticides when signs of injury on trees or plants and kill it before they spread, and the use of pesticides according to the type of injury or lesion, and taking into account the concentration of the spray solution according to each case.

H- Awareness and guard:

Must be suitable plan to guard the parks put up does not happen the loss or destruction of crops as a result of ill-treatment and use, and must put up signs to raise awareness of the public workers and pioneers visitors, noting the need for the establishment of new plants replace losses and damaged just this shortage occurs even have a chance for equitable growth of these plants on other plants.

3 CONCRETE

3.1 General

All specifications according to standard Egyptian specifications and the Egyptian Building code.

(1) All concrete works shall comply with the following standards:

- BS EN 206-1 Concrete. Specification, performance, production and conformity
- BS EN 1990 Basis of structural design
- BS EN 1992 Design of concrete structures
- BS EN 12504 Testing concrete in structures
- BS 1881 Testing concrete
- BS 8110 Reinforced concrete structures design and construction
- BS 8000 Workmanship on building sites. Code of practice for concrete work.
- ACI 305 Hot weather concreting

(2) The costs of all tests of concrete and / or its components shall be deemed to be included in the rates.

(3) All equipment employed for concrete works require the approval of the Engineer prior to dispatching to the Project.

(4) All sites have to be cleaned from remaining concrete and other materials in within 24 hours after finishing the concrete work. Therefore it is recommended to use a mobile

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container with side and bottom steel sheets in an appropriate dimension for the temporary storage / preparation of concrete.

3.2 Materials

3.2.1 Cement

(1) The cement to be used in the works shall be obtained from an approved manufacturer, and shall comply with the requirements of BS EN 197. BS 12.

(2) All cement to be used in works being below ground level shall be sulphate resisting Portland cement (SRPC) and shall comply with the requirements of BS 4027.

3.2.1.1 Certification for Cement

For each delivery of cement, the Contractor shall furnish, free of cost, test certificates in accordance with BS EN 196 "Methods of testing cement", relating to the cement to be used on the work. Analyses of the cement shall be shown.

3.2.1.2 Storage of Cement

(1) The Contractor shall provide a well ventilated waterproof shed or sheds to store the required amount of cement. Each shed shall have a suitable floor built at such a height that the cement is kept dry at all times. Delivery and stacking shall be arranged in such a way that the various consignments can be used in the order of their delivery. Cement shall not be taken from the shed until immediately before its use in the works.

(2) Different types of cements shall be stored in separate compartments. If intermixing is occurred all cement concerned will be condemned by the Engineer and shall be removed immediately from site.

(3) No cement which, in the opinion of the Engineer, has deteriorated or hardened shall be used on the works and such cement shall be immediately removed from site.

(4) Any cement which is stored on site for a period in excess of 28 days shall be tested in accordance with the relevant Standard prior to use.

3.2.2 Natural Aggregate

(1) All aggregates shall comply with the requirements of BS EN 12620.

(2) The fine aggregate shall consist of siliceous natural sand, having hard, strong durable particles and shall come from an approved source. It shall be clean and free from salt or organic matter.

(3) Coarse aggregate shall consist of gravel, crushed gravel, or other approved inert materials of similar characteristics and shall be clean, hard and sound. No material of a shale or schistose nature shall be used.

(4) Aggregates shall not contain more than 0.5% by weight of clay. The sulphate content shall not exceed 1% by weight.

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- (5) Aggregates shall be screened or washed, if so directed by the Engineer.
- (6) Each type and grading of aggregate shall be stored separately in bins of a type and size approved by the Engineer. They shall be provided with flooring of concrete or other approved material having sufficient slope to ensure adequate drainage of surplus water.
- (7) The chloride and sulphate content of the aggregate shall be determined and in all cases be considered together with the content in the mixing water.
- (8) The combined aggregate should be as coarse-grained and densely-graded as possible. The maximum particle size should be so chosen as to be compatible with mixing, handling, placing and working the concrete. Its normal size shall not exceed one third of the smallest dimension of the component to be concreted. With closely spaced reinforcement or small concrete cover, the greater part of the aggregate shall consist of particles smaller than the distance between adjacent bars and between the bars and formwork. Maximum size of coarse aggregates in all cases shall be 20 mm.
- (9) The concrete shall contain a certain quantity of ultra fine particles to be properly workable and achieve a close texture. The ultra fines content comprises the cement, the aggregate particles of 0 – 0.25 mm size and such additional material of this particle size range as it may be necessary to introduce. Such additional material, if any shall consist of natural or artificial mineral substances comprising, as far as possible, a mixture of differently sized particles which do not soften and do not impair the durability of the concrete. An adequate content of ultra fine material is especially important in concrete which has to be conveyed long distances or, in concrete for thin-walled densely reinforced components and, in waterproof concrete.
- (10) After approval by the Engineer, the whole of the aggregate supplied for use on the Works shall be obtained from the approved sources and the quality and grading shall be maintained consistent and equal in all respects to the samples submitted. Should it become necessary to change the source of supply for any of the materials, new tests shall be done to determine the proportions of the materials to be used and adequate steps shall be taken to maintain the required standard of the materials.
- (11) Sieve and sedimentation tests shall be carried out when the first delivery is affected and thereafter at intervals as directed by the Engineer.

3.2.3 Water for Concreting

- (1) The water used for mixing or curing of concrete and washing the aggregates shall be clean and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances. No salty water shall be used. BS EN 1008 shall apply.
- (2) A thorough chemical water analysis shall be done before using a certain water source for concrete mixing and test certificates from an independent laboratory shall be approved by the Engineer.
- (3) When comparative tests are done with distilled water of known quality, any indications of unsoundness, marked change in time of set, or reduction of more than 10% in mortar strength shall be sufficient cause for the rejection of the water under test.

(4) The Contractor shall not take water for use in concrete from shallow, muddy or marshy sources.

3.3 Admixtures and Additives

(1) Preliminary strength tests shall be carried out to ensure that admixtures and additives do not adversely affect the concrete to which they have been added.

(2) Additives may be added to the concrete if they do not adversely affect the strength and durability of the concrete and the corrosion protection of the reinforcement.

(3) In no case shall admixtures or additives be added to concrete, cement mortar or grout without the express permission of the Engineer in writing.

(4) Additives and admixtures, if approved by the Engineer, shall be used strictly in accordance with the manufacturers' instructions.

(5) Chloride based admixtures will not be allowed.

3.4 Quality of Concrete

(1) The class of concrete required is specified in the following tables, on the drawings and / or in the Bills of Quantities for the particular position of the works to be constructed.

(2) The quantity of water added shall only be sufficient to produce a dense concrete which can be fully compacted without undue difficulty, due allowance being made for the moisture content of the aggregates.

(3) The strength class of concrete shall be as designated in the following Tables:(extract of BS 8110 Concrete and Reinforced Concrete):

Concrete Strength Class	Minimal Nominal Compressive Strength of each test cylinder $f_{ck,cyl}$ [N/mm ²]	Minimal Nominal Compressive Strength of each test cube $f_{ck,cube}$ [N/mm ²]
C8/10	8	10
C12/15	12	15
C16/20	16	20
C20/25	20	25
C25/30	25	30
C30/37	30	37
C35/45	35	45

Or:

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3.5 Design of Concrete Mixes

(1) Before commencing any concrete work, the Contractor shall design the mixes for the concrete which he proposes to incorporate in the Permanent Works. Each mix shall be designed to produce the required class of concrete having a characteristic strength not less than the appropriate value specified above. Each design mix shall fulfil the following requirements:

- (a) The combined grading of coarse and fine aggregate shall be continuous;
- (b) The proportions and properties of the mix shall be within the limits set out for the various classes and types of concrete described in this Specification;
- (c) The water/cement ratio shall be consistent with attaining the average strength but without the ratio exceeding the specified maximum. The aggregate/cement ratio shall be suitable to achieve the minimum workability consistent with proper compaction by the methods specified.

(2) When submitting his proposals for design mixes to the Engineer, the Contractor shall provide, in addition to details of his cement, aggregates and water as specified earlier, details of:

- (a) The proportions in which the dry materials are to be mixed, including the aggregate/cement ratio, cement per cubic metre of compacted concrete and the sieve analyses of the individual and combined aggregates;
- (b) The water/cement ratio to be adopted;
- (c) The workability of the mix and the range in which it is to be maintained;
- (d) The 28-day individual and average strengths for at least six previously obtained test cubes;
- (e) The individual and average densities of the six cubes;
- (f) The dates on which the cubes were made and tested;
- (g) Any other relevant information.

(3) Following the Engineer's approval of the design mixes, the Contractor shall prepare trial mixes of each class of concrete in the presence of the Engineer's Representative. Each batch shall be not less than 0.5 m³ of concrete and shall be mixed in the same mixer which the Contractor proposes to use throughout the construction of the Works. Sieve analyses and moisture content determination shall be done on the aggregates. The batches of concrete shall be mixed as specified herein and tested.

(4) The Contractor shall allow sufficient time in his programme for designing and preparing trial mixes and testing test cubes obtained there from.

(5) If during the course of the works the concrete fails to comply with the specified requirements or the source of aggregate or cement should differ from those with which the preliminary design mixes were carried out, the Engineer will instruct the Contractor to prepare further design mixes, which will be tested in accordance with the above procedure.

4 REINFORCEMENT

4.1 Certificates for Reinforcement

All deliveries of steel reinforcement shall be accompanied by the manufacturer's certificate giving the results of tests carried out in accordance with the requirements of the relevant standard. The Engineer may require the Contractor to submit samples of steel from each delivery to an approved Authority for testing, the costs of all samples and tests shall be deemed to be included in the Contractor's rates for reinforcement.

4.2 Material

- (a) Mild Steel Bars: Main round steel bars – yield stress minimum 240 N/mm²,
- (b) High Yield Bars: Deformed steel bars - yield stress minimum 360 N/mm²,

(1) Reinforcing drawings and bar bending schedules shall, unless otherwise indicated or provided on the drawings, be prepared by the Contractor and checked and approved by the Engineer.

(2) Special attention should be paid to hooks, splices, bending radii, anchorage lengths and concrete cover.

4.3 Storage and Protection

(1) All reinforcing steel shall be stored on elevated platforms or other supports and must not be laid on the ground. It shall be stored in an orderly manner to facilitate inspections, each diameter and quality being kept separate.

(2) Reinforcing steel shall be protected at all times from damage and, when placed in the structure, shall be free from dirt, loose mill and rust scale, paint, oil and other foreign substance.

4.4 Bending

(1) Steel reinforcing bars shall be cut and bent by competent workmen. They shall be bent cold to templates which shall not vary appreciably from the shape and dimensions shown on the Drawings. All sharp bends shall be avoided and in no case shall the bending radius be less than 80 mm for reinforcing bar diameters less than 20 mm and 200 mm for reinforcing bar diameters equal or larger than 20 mm and less than 28 mm.

(2) Distance from the forms shall be maintained by means of stays, blocks, ties, hangers, or other approved supports. Blocks for holding reinforcement from contact with the forms shall be of suitable material of approved shape and dimensions. Special distance holders may be used for waterproof concrete of water tanks, etc. The holders shall be short enough to permit their ends to be covered with concrete. Reinforcing bars shall be securely wired together in such a manner that they will maintain their exact designated position during placing of concrete. The ends of all wires shall be turned into the concrete away from the face.

4.5 Splicing

- (1) All steel bars for concrete reinforcement with a total length of less than 12 m shall be furnished in the full length indicated on the Drawings. Steel bars with splices shown on the Drawings shall be spliced and steel bars with a total length exceeding 12 m may be spliced as given on the Drawings and as directed by the Engineer.
- (2) Welding of steel bars shall only be carried out if authorised by the Engineer.

4.6 Approval of Reinforcement

- (1) No concrete shall be placed until the reinforcement has been checked and approved by the Engineer. The Contractor shall give a minimum period of notice of 24 hours before the scheduled commencement of concreting in order to allow the Engineer time to carry out a full and detailed inspection of the reinforcement.
- (2) If in the Engineer's opinion additional reinforcement is required, this shall be placed as directed by the Engineer.

5 JOINTS IN CONCRETE

5.1 General

- (1) The Contractor is referred to the various types of joints required in the various structures and which are indicated in the drawings.
- (2) Only those joints itemised in the Bill of Quantity or specifically ordered by the Engineer will be measured and paid for as separate items otherwise they are deemed to be included in the rates for concrete.
- (3) The cost of the joints shall include for all labour and materials in forming the joint as shown on the drawings including, where required:
 - (a) Shuttering, notching for passage of reinforcement if necessary and cutting for passage of waterstop;
 - (b) Waterstop and jointing;
 - (c) Expansion joint filler;
 - (d) Formation of grooves and sealing with approved sealing compound;
 - (e) 20 mm dowel bars, 1 m long, with sleeve and packing, where shown on the drawings;
 - (f) Adequate grout checks.

5.2 Construction joints

- (1) Concrete bond across the joint shall be effected by removing the surface laitance and

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exposing the aggregate on the joint face as soon as the concrete has hardened. The surface shall be thoroughly washed with clean water prior to the resumption of concreting.

(2) The proposed position of the construction joints shall be submitted to the Engineer and approved by him before construction of each separate structure is commenced. A joint shall be made wherever concreting is finished for the day, or whenever concreting is stopped for any reason.

(3) All joints of water retaining structures shall be made water tight by introducing 20 cm wide rubber waterstop bar placed and fixed in the middle of the section width. The rubber waterstop (or metallic if required) shall have the approval of the Engineer for its type and quality.

(4) The cost of construction joints shall be deemed to be included in the rates for concrete.

5.3 Movement joints

(1) Movement joints, if required, shall be constructed in the positions as shown on the drawings or as directed or approved by the Engineer.

(2) Movement joints are measured separately and items are included in the Bill of Quantities for the various joints in each of the structures.

(3) Where indicated on the drawings, dowel bars shall be positioned across the joint. They shall have sawn ends and shall be provided with and secured to steel cradles on each side of the joint. They shall be placed with the midpoint of the longitudinal axes intersecting the plane of the joint at right angles, half the length of the bars being suitably coated to prevent bonding. Fitted over the coated length shall be a loose cardboard or plastic sleeve, closed and packed with glass fibre for a depth of 75 mm at the end of the bar remote from the joint.

(4) Where shown on the drawings or as directed by the Engineer, joints shall be sealed on one or both faces as required. On the face or faces requiring sealing, a groove of the shape and dimensions shown on the standard joint details shall be formed. Not earlier than fourteen days after the placing of the concrete, or when otherwise directed by the Engineer, the groove shall be cleaned, dried if necessary, primed and filled with a suitable approved mastic sealing compound to the underside of the chamfers. The sealer shall be prepared and applied strictly in accordance with the manufacturer's instructions.

(5) Partial contraction joints (for water retaining structures only) to be proposed by the contractor for the approval of the Engineer with a maximum span of 7.0 m.

5.4 Jointing Materials

(1) Expansion joints shall be filled with an approved jointing material which shall be compressible and resistant to weathering and extrusion.

(2) The jointing material shall be kept back from the face as indicated in the joint detail drawings, formed recesses shall be primed and sealed with an approved sealing compound.

(3) The Contractor shall be held responsible for the quality of all materials, including the adhesion of the joint sealings. Joint sealings, which are too soft, too brittle or which lack the

prescribed adhesion and resistance shall be replaced by the Contractor at no extra cost. The approval of material by the Engineer does not relieve the Contractor of his obligations under the Contract.

6 INSULATION WORKS

6.1 Bitumen

To protect surfaces of footings, tie walls, tie beams, column necks against aggressive soil, all surfaces of concrete in contact with earth shall be protected by the use of cold bitumen solution type D complying with BS 743 applied in two coats to give uniform and impervious finish

6.2 Sheet Membrain

6.2.1 Scope of work

This section covers the work of bituminous sheet membrane waterproofing as required by the Contract and includes the following type:

- Glass-fiber–Reinforced Bituminous Sheet Membrane Waterproofing.

Extent of bituminous sheet membrane waterproofing is indicated on Drawings.

It is the intention of the Specification and Drawings to indicate the entire work and all its component parts. The Contractor shall ascertain the precise nature and scope of the work and furnish, without additional cost to the Employer, all materials and components which may not be specifically mentioned or shown, but which are required for the proper installation and performance of the work.

The work shall include the coordination with actual Site conditions and the work of other trades affecting the work of Bituminous Sheet Membrane Waterproofing.

6.2.2 Submettals

The Contractor shall submit the following in accordance with Conditions of the Contract

A. Product Data:

Submit manufacturer's technical product data, installation instructions and recommendations for each waterproofing material required. Include data substantiating that material complies with requirements.

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B. Samples:

Submit three samples of sheet waterproofing and sheet seams.

6.2.3 Quality Assurance

- A. General: Obtain materials from a single manufacturer to the greatest extent possible. Provide secondary materials only as recommended by manufacturer of primary materials.
- B. Sequence and Scheduling: The work in this section requires careful coordination with the work of other sections to prevent damage to sheet waterproofing material.

6.2.4 Delivery and Handling

A. Delivery:

Materials shall be delivered to Site in manufacturer's tightly-closed labeled packages. Labels shall indicate manufacturer's name or trade mark and method of application.

B. Storage:

Sheet rolls shall be stored in a dry place. Rolls shall be placed on clean floors or platforms in such a way as to prevent damage to ends and soiling with foreign matters.

C. Handling:

Handle rolls goods with care. Do not roll on edges or ends

6.2.5 Materials and Products

A. Bituminous sheets shall meet the required following values:

1. Thickness: 4 mm.
2. Nominal Weight: 4kg/m² to ASTM 792.
3. Reinforcing Glass Mat: 80 gm/m², minimum.
4. Bitumen Content: 840 gm/m², minimum.
5. Softening Point: 110–115 Deg. C to ASTM D 36.
6. Penetration: 25 Deg. C 20–25 dmm to ASTM D 5.
7. Heat Resistance: 2 hours: 70 Deg. C to UEAtc.
8. Tensile Strength
 - a. Longitudinal: 350 N/50 mm to UEAtc
 - b. Transverse: 300 N/50 mm to ASTM D 146
9. Elongation
 - a. Longitudinal: 3.5% to UEAtc.
 - b. Transverse: 3% to ASTM D 146.
10. Tear Resistance
 - a. Longitudinal: 60 N minimum to UEAtc.
 - b. Transverse: 60 N minimum.

6.2.6 Insulation

A. System of Installation:

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Fully bonded to substrates (sheet adhered to all of the areas covered).

B. Overlaps:

Use lap joints to seal membrane sheets together in the field. Overlaps shall be of a minimum width of 100 mm. Heat overlaps from the top and reseal with a trowel to ensure seam integrity.

C. Flashing:

Comply with manufacturer's printed instructions and details and provide and special pieces or fittings recommended by manufacture.

D. Expansion Joints:

Install joint filler as recommended by manufacturer, with protruding rounded surface. Apply 200 mm with strip of membrane on joint followed by membrane application.

E. Overlapping onto Vertical Surfaces:

Sheets shall be overlapped to the vertical surfaces of the structures (parapets, walls and the like) for a distance not less than 200 mm. Prime vertical surfaces to be overlapped onto, and fix sheets in the same way specified here before for horizontal surfaces

6.2.7 Cleaning

After completion of works, remove any materials, debris and empty cans caused by waterproofing from covered surfaces

6.2.8 IN Site Testing

Before completed membranes on horizontal surfaces of roofs, bathrooms, toilets, fountains, flower boxes and the like are covered by protection course or other work, test for leaks with 50 mm depth of water maintained for 24 hours. Repair any leaks revealed by examination of substructures and repeat test until no leakage is observed

6.2.9 Protection

Take sufficient precautions for protection of completed sheet waterproofing during performing other subsequent works over sheets and throughout remainder of construction period. Do not allow traffic of any type on unprotected membrane.

7 MORTARS AND PLASTERS

(1) The mixes of mortars and plasters for blockwork, plastering and for external rendering shall be as per the following table:

Cement	Mix Proportions
--------	-----------------

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Mortar	Cement [kg]	Lime	Sand [m ³]
Grade A	350	---	1.0
Grade B	300	---	1.0
Grade C	250	---	1.0
Grade D	150	---	1.0

(2) The ingredients for cement mortars shall be measured in proper gauge boxes on a boarded platform, the ingredients being turned over twice dry and twice whilst water is added through a sprinkler rose. Alternatively, mixing may be by means of an approved mechanical batch mixer.

(3) Cement and sand mortar mix shall be used within 2 hours after starting addition of water; any amount of mix remaining should be collected and disposed.

(4) Mortar plasticizer shall be of an approved make and shall be used in the proportions and manner recommended by the manufacturer. The proportions of the mortar mix shall if necessary be adjusted in accordance with the manufacturer's recommendations.

(5) Where coloured mortar or rendering is specified the pigment shall be of an approved manufacture and shall not be injurious to other ingredients of the mortar. It shall be mixed with care to ensure even colouring throughout the mixture and a sufficient quantity shall be made to ensure completion of an area of rendering in one operation.

8 FINISHING

(1) The preparation of the surfaces for plastering includes raking out joints of concrete surfaces or blockwork to form key, dubbing out all uneven surfaces as required, temporary rules and boards, working around pipe clips and other similar obstructions, working behind pipes.

(2) All surfaces are to be finished true and smooth.

(3) External angles, where not protected by metal angle beads, shall be properly formed rounded angles to 10 mm radius unless otherwise directed.

(4) All joints between block walls and concrete members, all routes of electric or sanitary pipings should be covered by 20 cm wide metal lath strip; this will be included in the rates.

(5) The prices shall include for 1 m x 1 m sample panels if so directed by the Engineer.

(6) Plasters and Mortars shall be to the grades and mix proportions specified.

(7) Plastering to internal walls and surfaces shall be composed of the layers, as hereafter detailed, to make up the complete thickness of 15 mm.

- (8) Backing coat shall consist of approximately 10 mm thick cement mortar Grade "C" and scratched to form key.
- (9) Finishing coat shall consist of a 5 mm thick layer mortar Grade "C" and finished with a steel float to approval.
- (10) Cement rendering shall be cement mortar Grade „A“ and shall be applied in two or three coats. Undercoats shall not exceed an average thickness of 10 mm and finishing coats an average thickness of 6 mm. Two coat rendering shall be to a total thickness of 16 mm and three coats rendering to a total thickness of 25 mm.
- (11) Where rendering is to be applied to concrete surfaces such faces shall be suitably treated to provide an adequate mechanical key for the rendering.
- The surface of brickwork blockwork or masonry to be rendered shall be thoroughly prepared before the first undercoat is applied by raking out the joints to form an efficient key for rendering.
- (12) Surfaces shall be thoroughly brushed down to clean off all dust and loose material. Particular attention shall be paid to the removal of mould oil or other deleterious substances prior to rendering. Each undercoat shall be scored to form an adequate key for subsequent coats. The surface of blockwork shall be thoroughly wetted with fresh water before rendering is applied.
- (13) Each rendering coat shall be kept moist for at least 48 hours and then given adequate time to dry out thoroughly before the application of any subsequent coats. The surface shall then be wetted immediately before the application of any further coat.
- (14) The finishing coat shall have a steel float finish to true planes and regular curves and to an even and polished surface. Arises shall be rounded and in true alignment and a hollow fillet shall be run at internal angles.
- (15) The finished rendering shall be protected and cured as specified for concrete.

9 FLOOR, WALL, ROOF AND CEILING FINISHES

All specifications according to standard Egyptian specifications and the Egyptian Building code.

9.1 Materials

- (1) Materials used in the mixing of mortars and plasters for finishing to internal surfaces shall be as specified for mortars and plasters.
- (2) Glazed wall tiles shall be of a minimum thickness of 6 mm and to the colour and pattern as instructed by the Engineer.
- (3) Ceramic floor tiles (non slip) shall be of a minimum thickness of 8 mm and to the colour and pattern as instructed by the Engineer.

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- (4) Mosaic floor tiles shall be 200 mm x 200 mm minimum thickness 20 mm. Colour and pattern shall be as indicated on the drawings, in the Bill of Quantities, or as instructed by the Engineer.
- (5) Sornaga floor tiles shall be 200 mm x 200 mm, minimum thickness 8 mm, colour and pattern shall be as indicated on the drawings, in the Bill of Quantities, or as instructed by the Engineer.
- (6) Cement floor tiles shall be 200 mm x 200 mm, minimum thickness 20 mm, colour and pattern shall be as indicated on the drawings, in the Bill of Quantities, or as instructed by the Engineer.
- (7) Marble floor tiles shall be 500 mm x 500 mm, minimum thickness 40 mm, Colour and pattern shall be as indicated on the drawings, in the Bill of Quantities, or as instructed by the Engineer.
- (8) Marble slabs for entrance steps shall have a minimum thickness of 40 mm for treads and 20 mm for risers. Colour and dimensions shall be as indicated on the drawings, in the Bill of Quantities, or as instructed by the Engineer.
- (9) Steelcrete floor tiles shall have a minimum thickness of 30 mm, colour and pattern shall be as indicated on the drawings, in the Bill of Quantities, or as instructed by the Engineer.

9.2 Interlock for walkways

9.2.1 DESCRIPTION OF WORK

This section covers Interlocking concrete paving blocks

9.2.2 Reference Standard

Works shall be performed in strict accordance with the stipulations of the Egyptian Standard Specifications (ES) latest edition

9.2.3 Submittals

Submit the following in accordance with Conditions of the Contract and Division-1 Specification Sections:

- A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations. Provide certifications stating that materials comply with requirements.
- B. Verification Samples: Submit representative samples of each element that is to be used in the finished work, showing the full range of color and finish

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variations expected. Provide at least three un-mounted units to locations agreed with the engineer for comment.

- C. Provide large scale shop drawings for installation to include plans and details showing exact size, shape, , finish, installation pattern and colors and submit to the Engineer for comments.

9.2.4 Quality control

- A. *Tests: Use standard test with manufacturer to determine if mortar and grout materials will obtain optimum adhesion, and shall be non-staining to installed paver and other materials constituting the paver installation. Schedule for sufficient time for testing and analysis of results to prevent delaying the work.*

Two blocks shall be drawn from each group of 2000 blocks for sampling. These blocks shall be tested for dimensional accuracy, compressive strength, abrasion and water absorption.

The results of the abroad mentioned tests should comply with the following results:

Compressive strength not less than 300 kg/cm² for 60 mm thick interlocking pavers

Water absorption should be:

2% absorbed after 10 minutes.

5% absorbed after 24 hours.

Loss in thickness after abrasion test on specimens prepared from the delivered tiles should be not more than 0.8 mm for the specimens (using Quartz as an abrasion material to a rotation distance of 500 m, with a compression strength on specimen 500 gm/cm²).

Tolerances in length and width is (+ 1.5 mm) and for height is (+ 3 mm).

Should any of the test blocks not comply with the required tests for dimensional accuracy, it shall be left to the discretion of the Engineer whether the whole consignment from which these blocks are selected shall be deemed not to comply with the specifications.

- B. Delivery, Storage and Handling:

Deliver pavers on protective, shrink wrapped pallets with metal strapping (vertically and horizontally) and nylon wrapped so movement by fork lift is permitted without disrupting original package.

Unload pavers at job site in such a manner that no damage occurs to product.

Pallets shall be stored complete and unopened until time of use so that the Company label indicating the style and color within the pallet can be clearly viewed

9.2.5 UNIT PAVERS

Inter Locking Concrete Paving Blocks: Shall be precast 60 mm thick for sidewalks. Solid interlocking paving units made from normal weight aggregates in sizes and shapes as indicated on Drawings. Concrete shall be a well compacted mixture at a ratio of 1:2:4 by weight cement: sand: gravel respectively.

Characteristic strength of concrete after 28 days shall not be less than 300 kg/cm² for sidewalks

Edges and surfaces of all blocks shall be at right angles to one another.

Dimension of the interlocking concrete pavers as shown on drawings.

Adequate measure shall be taken to ensure that the concrete paving blocks are properly cured in a manner satisfactory to the Engineer.

The surface of all paving-blocks shall be plane, free from projections, depressions, crazing, and from damages to edges and corners. When a cut is examined, paving block shall show a reasonable uniform texture.

The block must include side spacers of 15 mm thickness in order to option uniform spacing in laying of blocks and to enable the fine sand to fill the gabs between blocks to start the interlocking action.

Pattern and colors of blocks according to drawings.

9.2.6 EXECUTION

- A. Examine surfaces receiving pavers, in the presence of the "installer", for compliance with requirements for installation tolerances and other conditions affecting performance of the unit pavers.

Do not proceed with installation until unsatisfactory conditions have been corrected.

Verify that sub-grade preparation, compacted density and elevations conform to plans and specifications.

Verify that the base materials, thickness, compaction density, surface tolerances and elevations conform to the plans and specifications.

- B. Accuracy:

On completion, the finished surface level shall be within 10mm of the design level and the maximum deviation within the compacted surface, measured by a 3m straight edge, shall not exceed 10mm. The level of any two adjacent blocks/slabs shall not differ by more than 2mm. Any areas of paving which do not comply with these tolerances shall be removed, and sand-laying course lifted and relaid and the paving blocks/slabs relaid to the correct levels.

10 PAINTWORK

10.1 General

All specifications according to standard Egyptian specifications and the Egyptian Building code.

- (1) All paints shall be obtained from an approved manufacturer. Where paint is to be used on the site samples shall be provided for the Engineer's approval prior to delivery. Details of the type and manufacture of the paint shall be provided for all items which are painted prior to delivery to site.
- (2) All material shall be delivered in sealed containers bearing the manufacturer's name and description of contents.
- (3) All paints shall be applied strictly in accordance with the manufacturer's instructions.
- (4) The colour of the paints shall be to the approval of the Engineer and where possible alternative coats shall be of different shades.
- (5) All preparation and painting is to be carried out under dry conditions.
- (6) The Engineer may take samples from painter's kettles for analysis and testing. No thinners or other materials shall be added to the paint without the consent of the Engineer.

10.2 Materials

10.2.1 Cement Paint

- (1) For outside use to exposed surfaces of fair faced concrete.
- (2) Cement paint shall be white or coloured portland cement adjusted for use as a paint with the necessary additives for outside use.
- (3) Applied in under coat and finished coat.

10.2.2 Acrylic Paint

Acrylic paint finish for interior use shall be 100% pure acrylic base not less than 20% of total weight:

- (a) Lustreless (flat) acrylic finish, 2 coats over filler coat with total dry film thickness not less than 65 μ , excluding filler coat;
- (b) Filler coat: solvent thinned filler for porous surfaces;
- (c) First and second finish coats: Acrylic Emulsion.

11 PLUMBING

11.1 General

All specifications according to standard Egyptian specifications and the Egyptian Building code.

(1) The Contractor shall make all arrangements with the Water Supply Authority to ensure any connection is laid and metered to the Authority's standards.

(2) Catalogue cuts and specifications for all plumbing items shall be submitted to the Engineer for approval. Any item shipped without prior approval may be subject to rejection and replaced at the Contractor's expense.

11.2 Materials

(1) Pipes and fittings for water and sanitation shall be galvanised steel, to the gauge and type approved, with screw threaded fittings, in accordance with BS 1387.

(2) Holder bats, where required, shall be brass school board pattern with tails for building into wall or brass brackets for plugging and screwing to wall.

(3) Stop cocks shall be made of brass.

(4) Bib and pillar taps shall be hot pressed brass, chromium plated with easy clean shield, crutch or capstan head.

(5) The sanitary fittings required as shown on the drawings and/or in the Bill of Quantities shall be obtained from an approved firm.

(6) Lavatory basins, unless otherwise described, shall be white vitreous sanitary china, minimum dimension 55 x 40 cm, complete with chromium plated 15 mm diameter pillar tap, gap overflow, white plastic coated support brackets, 35 mm diameter chrome plated waste outlet, chrome plated chain and plug, 35 mm diameter chrome plated bottle trap.

(7) Toilet systems of the oriental (squat) type shall be white vitreous china suitable for floor installation and be planned with water flushing. The flush tank shall have a float valve, be installed at a height of approximately 2 m and have a capacity of at least 6 litres. The flushing pipe shall have an internal diameter of 32 mm, be led in a straight line to the toilet basin and shall have a water distributor at the end which shall distribute the water in a radial fashion throughout the basin. An odour trap shall be installed at the outflow of the basin.

(8) Each WC room should have a 13 mm water tap on adjacent wall 40 cm high from floor level.

(9) Each WC room should have a toilet roll holder, chrome plated, fixed on wall at 50 cm height from floor level.

(10) Toilet systems of the western type shall be white vitreous china consisting of:

Ceramic wash down pan;

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Solid plastic seat and cover;

Flushing cisterns;

13 mm hose pipe;

Paper roll holder;

All necessary valves, fittings, materials, connection to water supply and wastewater system.

(12) Sink units shall comprise stainless steel sink with double drain and cupboards and drawers below. Sink units shall be installed complete with taps, water and waste connections as shown on the drawings.

(13) The sink units shall be in accordance with BS.



ANNEX NO. (1)

PROJECT LOCATION AERIAL VIEW

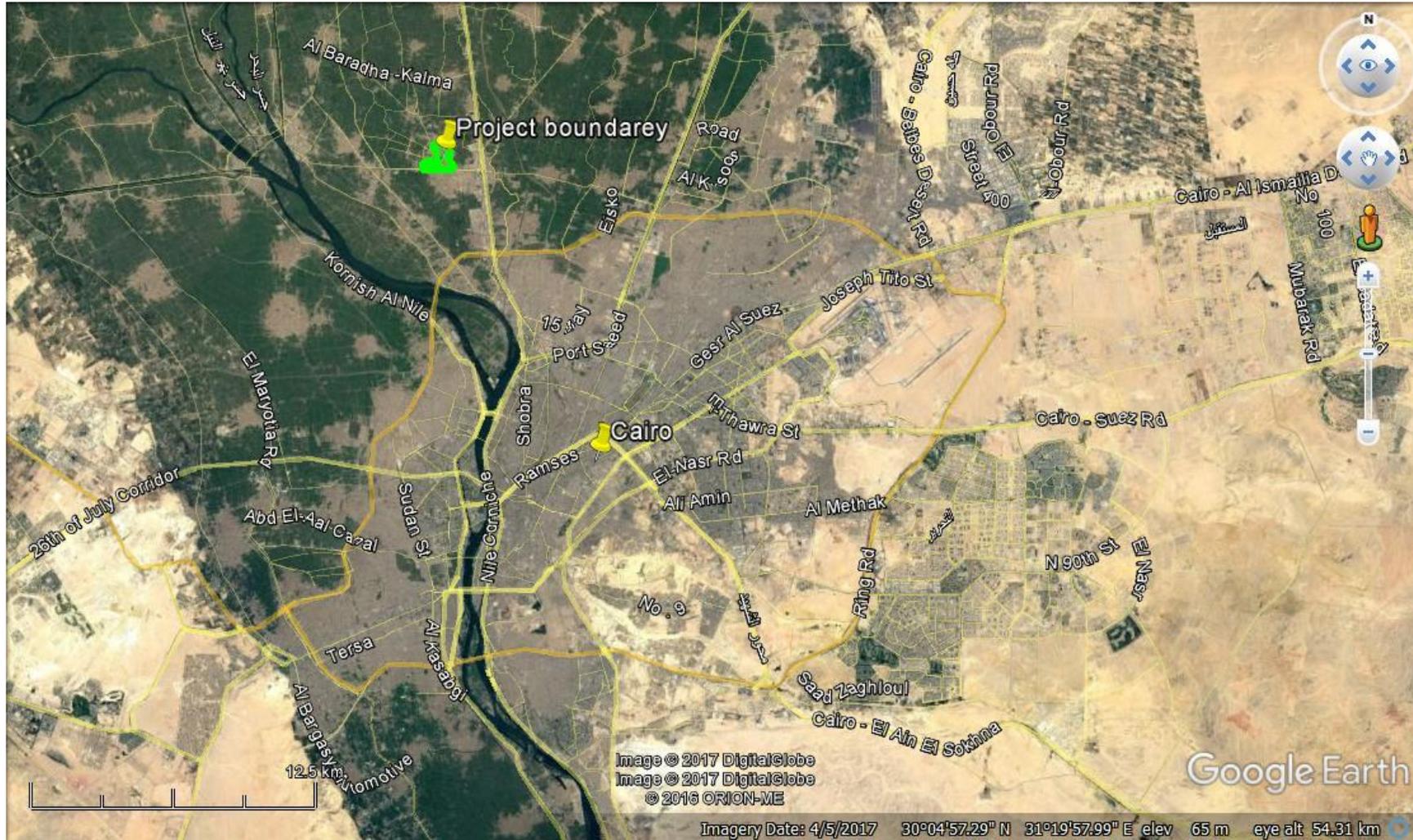
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and



TENDER DOSSIER for D2-QAL2
Works of Side Streets Paving with Interlock Tiles and Canal
Covering & Landscaping in Bahry Sekka Hadid Area-Qalayoub –
Qalubeya Governorate
ملف مناقصة أعمال رصف الشوارع الداخلية ببلاط الانترلوك وتغطية قناة وتجميل المكان
بمنطقة بحري السكة الحديد بقلوب



Aerial view for the project location

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Improving side streets with interlock tiles and covering a canal in connection with residential buildings in Qalyoub Bahr Sekka Hadid area – (D2-QAL2) - Qalubeya Governorate



and



ملف مناقصة أعمال تطوير الشوارع الداخلية باستعمال بلاط التريلوك مع تغطية ترعة متصلة بالمباني السكنية بمنطقة قليوب بحري السكة الحديدية - محافظة القليوبية