Plinth’s construction works

Stack D3 at DKH terminal

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Introduction

The scope of the works comprises of the construction of a new rigid reinforced concrete container bases stacking at D3, new plinths will be constructed between existing RTG runway, and the truck lane which will repaired as asphalt surface repair. The Plinths are designed for stacking containers in blocks 6 high and 6 wide.

1. Scope of work.

1.1 Plinth's construction works

- The contractor shall review container bases design and ensure that Plinths are designed for stacking containers in blocks 6 high using RTG cranes.

- The contractor shall submit a full design for storm water drainage system reviewed and approved from AICT accepted well-known consultant for prior approval.

- A full set of working drawings reviewed and approved from an accepted well-known consultant should be submitted for prior approval.

- The contractor shall remove the existing paver blocks and shall excavate the area till 45cm depth.

- Contractor shall remove disposal to approved dumping area using his equipment.

- Contractor shall compact the sub grade to achieve a density not less than 95% of maximum dry density of sub grade

- Los Angeles abrasion value no greater than 50 (ASTM C535)

- Ten Percent Fines Value (TFV) greater than 50kN(BS 812-lll)

- Magnesium soundness value less than 35 (MS35). (BS 812-121)

- Flakiness index no greater than 50 (BS 812-105)

- Water Absorption (supplier to stare value) (BS 612-2)

- Fines Content (M25um) shall be non-plastic (BS 1377-2)

- The laboratory CBR value shall be a minimum of 60% at 100% of the laboratory maximum dry density after soaking for 96 hours.

- Laboratory Samples to be defined by AICT engineer, tests should be done through faculty of engineering, or any other owner approved labs.

- Only if needed **(existing subbase soil after excavation and compaction could not achieve required bearing capacity) Supply**, filling and compaction cement soil replacement layer 20cm total thickness of crushed stone and cement 50Kg/m^3, compaction ratio not less than 100% from Max. dry density, then; to apply all above mentioned testing procedure and according to Specifications and Directions of the engineer.

- Contractor to Cast 10 Cm for the plane concrete under the new rigid reinforced concrete plinths Min cement content must be not less than 370 kg /m^3 for C20

- Furnish, Form, Place, finish and Cure Reinforced Concrete for container base slabs of thickness 35 cm, with Minimum cement content 400 kg/m3.

- Concrete must be cured according to The Egyptian Code and The Egyptian Standards Specifications. (ESS)

- Contractor shall submit compressive strength test result of standard cubes after 7 and 28 days

- The Contractor shall check the level relative to Mean Sea Level (MSL) of any temporary benchmarks to be used in survey of the Works and shall establish additional benchmarks such that no level is transferred more than one kilometer without being tied into an accepted bench mark.

- Benchmarks shall be numbered, and their establishment shall be to the acceptance of the Engineer.

- All existing level and other survey information is given without warranty regarding accuracy. Prior to commencement of any work the Contractor is required to undertake in the presence of the Engineer, a comprehensive survey of existing levels. All records of the survey and levelling work upon which the measurement of the Works will be based are to be agreed and signed by both Contractor and Engineer.

- Unless otherwise approved, existing levels are to be measured arid agreed at least seven days before such levels are to be disturbed by earthwork or other activities

- The method of surveying shall be to the acceptance of the Engineer. Field books and tabulated data shall be well maintained and shall be available for inspection and checking by the Engineer when requested.

    - The Works include the following items:

Excavation to appropriate levels to allow construction of new container base slabs.

Ground treatment as required if needed

Construction of new concrete pavement

Construction of new reinforced concrete plinths

Construction of storm water drainage system

Provision of Stack markings.

- The Contractor shall submit a detailed method statement to the Engineer for approval defining his proposed arrangement to avoid the effects of thermal cracking and temperature differentials. The method statement shall include but not be limited to, the size and sequence of pours, concrete temperature-monitoring system of pours, formwork type and removal time, and calculations for temperature and strain development at internal and surface locations, considering here of hydration, ambient radiation and temperature, and physical restraints.

- Subject to approval, the Contractor may include in his mix design an admixture in the form of a retarder, plasticiser or water reducing agent to produce a more workable mix taking into consideration the necessity for the satisfactory compaction of the indicated slab thicknesses. The Contractor shall be deemed to have included in his rates for admixtures if he intends to use them. The Contractor shall have stated in the method statements submitted with his tender whether he intends to use any admixture, the trade name, if any, of the admixture, its nature and composition and the name and address of the proposed supplier.

- The Contractor shall submit for prior approval details of his proposed mixes, including the proportions of all materials and intended compacting factor. He shall state a target mean strength and standard deviation to take account of the specified strengths and the requirements for works flexural strength and core tests.

- The concrete shall conform with the requirements of BS EN 13877-2. A pavement quality concrete shall be used; the maximum aggregate size shall be 40mm.

- The constituents of the concrete shall conform with BS EN 206-1 and BS 8500-1 and BS EN 13677-1.

- The Pavement Quality (PQ) concrete for surface slabs should be C40/32 concrete with minimum flexural strength of 4.5 MPa.

- If specified minimum cement contents are not sufficient to produce concrete of the flexural strength required, they shall be increased as necessary, without additional compensation under the Contract.

1.2 Asphalt paving repair

- Contractor to survey working area to determine the varies level difference
- Contractor to remove surface layer of asphalt paving "not less than 8 cm thickness" using Asphalt scraper machine
- Contractor to remove cutting results to approved dumping area out the terminal using trucks
- Contractor to clean the surface layer mechanically from any loose materials or fine sands
- Contractor to apply RC1 (0.75-1 kg/m2) between existing layer and new layer
- using asphalt finisher Contractor to apply surface layers (wearing course) specified to class 4 road classification
- contractor to compact the surface layer using compactor not less than 12ton
- Contractor to check levels after finishing in attendance of AICT engineer for acceptance or rejection

2. Work procedures and technical specifications

- Technical specifications

Excavation work

- Excavation shall be carried out to the required lines, levels and profiles according AICT Engineering Representative may direct or approve in writing. The work shall be carried out in such a way as to avoid disturbance to the surrounding ground, and particular care shall be taken to maintain stability when excavating in close proximity to existing works or structures.
- Contractor shall perform on his cost initial "before excavation" and final "after excavation" survey to determine levels after excavation in attendance of AICT engineer
- Open excavations shall be maintained in stable condition and shall be protected against any deterioration due to the effects of inclement weather.
- All material arising from excavations shall be disposed of offsite, when it shall be placed directly in such Works or set aside for use as and when required in approved stockpiles.
- The Contractor shall notify the AICT Engineering Representative without delay of any unusual ground conditions encountered during excavation.
- In the location of existing services excavation shall be carried out by manual tools and labors and every care shall be taken to avoid damage to such services including providing temporary supports where necessary. Services shall have been first located by hand-digging.
- Any damage to any existing service caused by the Contractor’s activities shall be immediately notified to AICT Representative, and the Contractor shall to his cost take immediate action to repair or reinstate the service
- No excavation work is allowed at night to avoid any damages could be happened to existing services such as: electrical cables, water pipe, drainage pipe…etc.
- When excavations have been taken out accurately to the profiles or dimensions required for the work, the Contractor shall inform AICT Engineering Representative to carry out an inspection

- Excavation works shall include any dewatering works required for the excavated area without any additional cost

Sub grade layer

- Contractor to Notify AICT Engineer when excavations have reached required sub grade.
- Reconstruct sub grades damaged by rain, accumulated water, or construction activities, as directed by the AICT Engineer.
- Contractor to perform proctor test to determine the dry density of natural soil.
- Contractor to compact the sub grade layer to achieve not less than 95% of layer dry density
- After compaction the layer should be in one level along the area.
- Sub grade layer shall be covered with the pavement layer as soon as possible after inspection & compaction test to prevent moisture content rising above the permitted and prevent erosion, scour.
- If this happened as an effect of rain, traffic or other cause, contractor shall repair and retest the layer on his cost.

Sub Base layer

Consist of approved granular materials such as gravel or crushed rocks blended with fine sand by required grading and should be clear from any fine clay or any organic materials.

Percentage of weight of passing sieves with openings of the four for Stones thick, thin will be as follows.

76.20 mm	100
63.50	100-90
38.10	60-25
19.05mm	10-0
9.52	100
4.46	100-85
149 micron	25-5

- Plasticity index not more than 6 % and liquid limit not more than 25%.
- percentage of passing from sieve no. 200 not more than 10%
- sand equivalent coefficient not more than 25%
- Resistance to Degradation of Small-Size Coarse Aggregate should less than 50%
- Percentage of achieved compaction must be more than 95% of max dry density using modified Proctor test
- The CBR Not less than 30 %.
- Contractor shall perform all tests required by AICT engineer to assure the previously mentioned specifications
- Subbase layer thickness shall not less than 15 cm/ layer
- Placing backfill or fill material on surfaces that are muddy or during rain is not allowed

Base Layer

- Contractor to submit and lay compact and test the base layer according to following specifications:
- grading of aggregates from 2.5 to 3/8 inches
- CBR must be not less than 50%
- Plasticity index not more than 6 % and liquid limit not more than 25%
- Resistance to Degradation of Small-Size Coarse Aggregate should be 35%
- Los Angles test result must be less than 50%
- Compaction must achieve 98% of dry density measured from sand cone method (in site test)

MCO Layer

- This material is priming material to be apply after maximum 16hrs of finish final level of base layer

- This material must be sprayed between base layer and bas layer of asphalt pavement by rate 1.5 kg \ m2 and It is not allowed to spray the MC0 if the spraying performance & rate is affected by wind or rain or such likes.
- Base layer must be dry and clean of any fine sand or loose materials or particles
- This material must be sprayed mechanically using proper equipment.
- This material should be complied with Specifications of Egyptian code for roads construction
- The temperature of this material Must be constant between 60 degrees Celsius to 80 degrees Celsius using approved vehicle with spray bar and multiple nozzles
- If the area of asphalt paving is small area and vehicle cannot be used, skilled labors can be used in spraying MC0
- Applying MC0 during rainy weather is not allowed

RC1 layer

- This material sprayed between base layers of asphalt and link layer of asphalt by rate 0.57-1 kg/m2 and between link layer of asphalt and surface layer of asphalt by same rate.
- This material must be sprayed mechanically using proper equipment.
- This material must be comply with Specifications of the American Society for employees of the roads and Egyptian standard specification ESS
- the temperature of this material must be between 65 degrees Celsius to 95 degrees Celsius during applying of this layer

	Mix Reference				
	A1	*B1*	*C1*	**D1**	**D2**
Use	Lean Concrete and Blinding	Unreinforced concrete	Reinforced concrete	Reinforced concrete	Reinforced concrete
Characteristic strength (N/mm_2)	10	20	30	40	45
Minimum cover (mm)	N/A	N/A	50	50	75
Nominal max. aggregate size	20	20	20	20	20
Cement-type cement replacements (refer to Clauses 7.003 and 7.007)	OPC	OPC or 75% OPC/25% PFA or 50% OPC/50% GGBFS	OPC or 75% OPC/25% PFA or 45% OPC/55% GGBFS	OPC or 75% OPC/25% PFA or 45% OPC/55% GGBFS	OPC or 70% OPC/30% PFA or 30% OPC/70% GGBFS or blended hydraulic cement
- Min cement content (kg/m_3)	100	325	370	370	420
- Max cement content (kg/m_3)	N/A	375	425	425	450
Water/cement ratio					
- Absolute max	N/A	0.50	0.45	0.40	0.38
- Nominal design	N/A	0.43	0.40	0.38	0.36
Type of coarse aggregate	Natural / crushed	Natural / crushed	Natural / crushed	crushed	crushed
Maximum chloride content by Wt. cement % (refer to Clause 7.031)	N/A	0.20% -general 0.20% - with sulphate resisting Portland cement	0.20% - general 0.20% - with sulphate resisting Portland cement	0.20% - general 0.20% - with sulphate resisting Portland cement	0.20% - general 0.20% - with sulphate resisting Portland cement
Workability					
- Slump (mm)	N/A	75 ± 25	75 ± 25	75 ± 25	100 ± 25
- Compacting factor	N/A	0.92	0.92	0.92	0.92
Max Temperature at placing (°C)	N/A	32	32	32	32
Maximum sulphate content by Wt. cement % (refer to Clause 7.032)	N/A	4	4	4	4

Asphalt paving "surface layer"

- Aggregates of asphalt materials shall be clean, hard and durable
- The percentage of material passing a 74 micron (no. 200) sieve shall not exceeds 8% of total mass of aggregates.
- Sieve analysis and Marshall test must be applied for at least 3 samples of asphalt mix, results should be complied with following specifications:

requirements	Hot mix asphalt mixture		
Material	12.5mm nominal size aggregate	25mm nominal size aggregates	37.5mm nominal size aggregates
Optimum binder content	4.0% - 6%	4.0% - 6%	4.0% - 6%
Stability	Not less than 15KN	Not less than 15KN	Not less than 15KN
Flow	2.0- 4.0mm	2.0- 4.0mm	2.0- 4.0mm
Voids total mixture	3.0-5.0 %	3.0-5.0 %	4.0-6.0 %
Percentage voids of mineral aggregates	13.0%	12.0%	12.0%
Voids filled with binder	65 – 75%	65 – 75%	65 – 75%

- the contractor shall perform all required test on his cost and submit the test results to AICT Engineering representative for approval and acceptance.

- Contractor shall transport the hot mix in clean, insulated vehicles and shall be coated during trip

- Asphalt mix shall be applied mechanically using finisher, manual placing of asphalt materials shall be allowed in the following circumstances:

  - for laying pavement on irregular shape area which machine cannot be used
  - if the edges of pavement layer at gullies or manholes

- Asphalt materials shall be laid and compacted in layers, which enable the specified thickness, levels and compaction to be achieved.
- Compaction shall be performed and completed immediately after asphalt lay to prevent mix temperature to fall below the min limit.
- Asphalt materials shall be rolled in longitudinal directions

- The Configuration

Thick aggregate ---------- not passes from sieve no 4 (4.75mm)

Thin aggregate ---------- passes from sieve no 4

Metal powder ---------- passes from sieve no 200 (74micron)

Graduation requirements of the metal powder

Sieve	30 (0.6 mm)	50 (0.3 mm)	200 (0.075mm)
%Passes by weight	100	100-95	100-70

Graduation requirements of the total mix configuration

1- for surface layer

Sieve	1.5"	1"	.75"	.5"	.375"	4	10	40	80	200
%Passes by weight	100	100	100	100	100-80	75-55	47-32	26-16	18-10	10-4

CHART 2: TRAFFIC CLASSIFICATION		
Type of Facility and Vehicle Types	**Maximum Trucks per Month (One Lane)**	**Traffic Class**
Residential driveways, parking stalls, parking lots for autos and pickup trucks. No regular truck traffic.	0	Class 1
Residential streets without regular truck traffic or city buses; traffic consisting of autos, home delivery trucks, trash pickup, occasional moving vans, etc.	60	Class 2
Collector streets, shopping center delivery lanes; up to 10 single-unit or 3-axle semi-trailer trucks per day or equivalents; average gross weights should be less than legal limit.	300	Class 3
Heavy trucks; up to 75 fully loaded 5-axle semi-trailer trucks per day; equivalent trucks in this class may include loaded 3-axle and 4-axle dump trucks, gross weights over 40,000 lbs.	2,250	Class 4

TRAFFIC CLASS 4						
	Aggregate Size	**Binder Type**	**Compaction Level**	**Minimum Lift Thickness**	**Recomended Lift Thickness**	**Maximum Lift Thickness**
Surface	9.5 mm	PG 64-22	100 gyrations	1"	1.5"	1.5"
	9.5 mm	PG 76-22	100 gyrations	1"	1.5"	1.5"
	9.5 mm SMA	PG 76-22	100 gyrations	1"	1.5"	1.5"
	12.5 mm SMA	PG 76-22	100 gyrations	1.5"	2"	2"
Base	19 mm	PG 64-22	75 gyrations	2"	3"	3"
	25 mm	PG 64-22	75 gyrations	3"	4"	5"

3. Conditions and terms

- The Contractor shall submit for prior approval details of his proposed mixes (concrete, asphalt, base layer soil replacement, …etc.), including the proportions of all materials and intended compacting factor. He shall state a target mean strength and standard deviation to take account of the specified strengths and the requirements for works flexural strength and core tests.

- All above mentioned proposed mixes (concrete, asphalt, base layer soil replacement, …etc.) should be reviewed and approved from AICT accepted well-known consultant.
- Contractor shall submit full detailed time frame for each area by working days for each task, after visit the site to inspect working areas dimensions & locations according to attached layouts to be able to exclude the duration of stoppage for bad weather or terminal operational conditions.

- Contractor method of statement and work procedures shall comply with all technical specifications and standards mentioned in these documents.

- Al mentioned quantities are **illustrated and estimated** quantities, actual quantities will be measured from site.

- All required tests of supplied materials shall be submitted to AICT engineer for approval or rejection

- It is not allowed under any conditions to apply any of base layers before receiving the tests results of the previous layer, any delays in work progress effected by delaying of test results will be contractor responsibility and discharged from his work duration

- Contractor shall submit list of the equipment he will use to perform the required repair works to be approved from AICT Civil Engineering Dept.

- Contractor shall submit the names of certified labs which will perform the required tests to AICT Civil Engineering Dept. for approval

- AICT engineer has the rights to reject any supplied materials which is not comply with specifications and standards, contractor must remove these materials off the site on his cost and responsibility

- The Contractor to submit his commercial offer based on specifications mentioned before which is comply with Egyptian code or ASTM.

- Contractor shall submit a list of sub-contractor's names "if any" along with their experience in such similar jobs.

- All required works and tests should be done under supervision of AICT Civil Engineering Dept.

- Repair area's location can be changed according to AICT engineering representative as he can notify the contractor in writing for any changes could be performed.

- Any damage to any existing service caused by the Contractor's activities shall be immediately notified to AICT Representative, and the Contractor shall to his cost take immediate action to repair or reinstate the service

- If the area of repair works is urgently needed to be finished according to terminal operating condition, the contractor may be obligated to work at night or in official vacations to speed up the work progress with no extra payment.

- If any clashes between repair work and terminal operating the 1st priority is to be for terminal operating.

- The contractor shall submit as-built drawings for all kinds of work either modified or constructed.

- The contractor shall transport all his materials using his equipment.

- Contractor may visit the site to take his necessary dimensions required or for any clarifications for his offers as the mentioned quantities are illustrated and esteemed quantities.

- The contractor shall fence-off his working boundary with mobile steel barriers and warning tape.

- The contractor shall issue all required gate pass and permits required to undertake his activities in accordance to Alexandria port authority regulations.

- The contractor shall adhere to the AICT safety and security regulations.

- Contractor shall submit monthly invoices along with inspection reports signed and approved from AICT Engineering representative

- Contractor shall submit his commercial offer according to BOQ attached with tender documents.

- Contractor shall submit recent financial statement along with his commercial offer

- All mentioned quantities are illustrated and estimated, it could be changed to (±25%), and actual quantities shall be measured from site.

- Contractor must have experience in such similar projects, past experience shall be submitted with technical offer

- AICT has the right to decrees the mentioned quantities without any responsibility towards the contractor

- 5 % shall be deducted by AICT from monthly invoice as guaranty to cover any defects appear in guaranty period of 24 months starting from total project final acceptance certificate date.

- Any defects under warranty period to be rectified by contractor under his own cost within 1 month otherwise AICT has the full authority to undertake required work to rectify defects and cost to be deducted from contractor retention.