Project:	**Construction of Shooting at Zayed Military City**	**مشـــــــــروع:**
Contract:	**CMW-22021-C001**	**عقـــــــــــد:**
Document Title:	**Application of Soil Stabilizer**	**عنوان الوثيقـة:**
Prepared By:	Saad UL Islam	**تم إعـــــدادها:**

المحتويـــات
CONTENTS

1.0	Introduction	المقدمـــــــــــــــــــــــــــــــة	1.0
2.0	Scope of Works	نطـــــــــــــــــاق الأعمـــــــــــــــــال	2.0
3.0	Sequence & Method	التســـلســـــــــــل والأسلـــــــــــــــوب	3.0
4.0	Programme	البرنـــــــامـــــــــــــــــــــــــج	4.0
5.0	Competency of Those Involved	كفـــــــــــــــاءة المشاركيـــــــــــــــن	5.0
6.0	Equipment to be Used	المعـــــــــــــدات المستخدمـــــــــــــة	6.0
7.0	Emergency Procedures	إجـــــــــــــراءات طارئـــــــــــــــة	7.0
8.0	Supervision	الإشـــــــــــــــــــــــــــــراف	8.0
9.0	Monitoring of Work	مراقبـــــــــــــة العمـــــــــــــــــل	9.0
10.0	Environmental	البيئـــــــــــــــــــــــــــــــــة	10.0
11.0	Approval, Review and Briefing	آليـــــة الموافقـــــة, المراجعـــــة والتلخيـــص	11.0

Appendices — **الملحقـــــات**

1. Risk Assessments — تقييـــــــــــــــم المخاطـــــــــــــــر
2. Task Sheets — أوراق العمـــــــــــــــــــــــــــــل
3. Drawings, BOQ and Specification References — مخططـات وجدول الكميات ومرجع المواصفـات

1.0 Introduction:

This document describes a general procedures and method of soil Stabilizer works along the structure and any other areas where necessary at **Construction of Shooting at Zayed Military City** Project.

Works shall be carried out in compliance with the drawing and project specification.

2.0 Scope of Works:

- This method statement describes the sequence of activities involved for Soil Stabilizer Works performed by M/S Mancon Construction Company and Testing laboratory services to be performed by Approved Laboratories.
- This method statement will be applicable for **CMW-22021-C001** Contract.
- Please refer to **Section 31 20 00 Clause 3.6 to 3.8** Backfilling detailing the constraints for this activity.

3.0 Sequence & Method:

Pre-Works:

- The required permits shall be applied and collected at least 24 hours before commencing the work.
- Sand filling will be start from finish floor level (F.F.L) of the shooting range (Facility-01).
- Sand filling around the shooting range (facility-01) should be laid properly with maximum **300mm** thickness and compact well to achieve required compaction percentage.
- Samples should be taken from each compacted layer by authorized laboratory for In-Situ density test.
- The safe slope for a soil depends on various factors such as soil type, moisture content and stability conditions. However, the friction angle of the soil is an important factor in determining the safe slope.
- The friction angle of a soil is the maximum angle at which the soil can be inclined before it begins to slide or collapse. The friction angle of a soil with a value of **39°** is considered to be relatively high and suggests that the soil has good shear strength.
- To determine the safe slope for a soil with friction angle of **39°**, we can use the following formulae:
  Safe Slope Angle = Friction Angle / 1.5
  Therefore, the safe slope angle for a soil with a friction angle of **39°** would be:
  Safe Slope Angle = 39° / 1.5 = 26°
- This means that the slope of the soil should not exceed **26°** to ensure stability and prevent sliding or collapse. However, it is important to note that other factors such as water content, soil type and other site-specific conditions should also be taken into consideration when determining the safe slope angle for a specific site.
  Tan26 = H/W
  W = H / Tan 26
  W = 7.1 / Tan26
  W = 14.55
- Based on the actual calculation the width of the backfill should be increased from **12.7 to 14.6m**.
- Minimum compaction percentage should be **95%** or as directed by engineer.
- Surface should be clean and free from all unwanted material for surface protection activity.

Works:

- Make sure compaction test results of top compacted layer are passed.
- Prior to start the soil stabilizer activity surface should be clean, and remove all unwanted material from required area.
- Repair or reestablish damaged grades, slopes prior to start the work.
- The soil stabilizer activity will proceed in only suitable weather condition.
- Make the holes at top layer having **20mm** diameter and **150mm** depth.
- Holes should be in staggered shape with **800mm** spacing.
- For better dispersion dilute **Sandfix-C** with water at the rate of **16%** and mix well for **10 minutes**.
- Each hole to be injected with **1 liter** of the diluted **Sandfix-C** material.
- Spray all the compacted surface area of the sloped sand filling with the diluted **Sandfix-C** with coverage rate of **1liter /m²**.
- Remove some backfilling from Shooting range (Facility-01) corner to make curve shape.
- Add some random backfilling around and above the shooting range.

4.0 Programme:

- Works shall be performed generally in accordance with the approved Programme and with start Date: 10/04/2023.

5.0 Competency of Those Involved:

- During the Soil Stabilizer activity only skilled, certified and authorized personnel should be involve.

6.0 Equipment to be Used:

Equipment Description	Equipment Description
Auto Level	Personal Protective Equipment (PPE)
Total Station	Tool Box with Hand Tools
Showel 966	Roller Compactor
Long Boom Excavator	Plate Compactor
Bob Cat	Spray Gun

7.0 Emergency Procedures:

- Contractor/Client/Consultant Health and Safety Plan copy is to be distributed to all the concerned Engineers/Site Supervisors. The safe work procedures mentioned there in are to be followed at site by all the personnel.
- Personal Protective Equipment (PPE) such as Helmet, Safety Shoes, and Reflective Jackets are mandatory to wear for all the working personnel, inspecting agencies and visitors. Other PPE are described in the Risk Assessment.
- Site rules and regulations such as parking of vehicles, access and egress, traffic management etc. are to be strictly followed by all the site crew.

- During hot weather, particularly in summer period, in accordance with UAE safety regulations, midday break to be implemented and strictly adhered to. Umbrellas to be provided to the site crew who work under the sun.
- Road crossing shall be done by strictly following proper procedures. Trained flagmen and adequate supervision to be available at site.

8.0 Supervision:

- Construction Supervision Consultant will make sure the activity is confirming the client requirement as per contractual and approved technical and engineering documents.

9.0 Monitoring of Work:

- Overall responsible for the safe execution of the works.
- Plan the materials, plant, equipment and all resources required for this activity.
- Ensure that all work procedures are followed correctly to the satisfaction of the Client, Consultants and Local Authorities.
- Supervision of personnel.
- Compliance of the works to the approved drawings, Specifications, Method Statement /ITPs /materials and to the satisfaction of the Client / Consultant and Local Authority requirements
- Providing task related TBT (Toolbox Talk) for safe execution of the work.
- Implementing and monitoring Quality and HSE requirements
- Submission of Working Inspection as per ITP.
- Arranging and conducting the FDT test.

10.0 Environmental:

- Site working personnel are to be provided with resting area, such as shaded areas by usage of umbrellas, air-conditioned pickup/mini bus etc. Shaded areas for personnel to eat and rest to be provided by Supervisors/Foremen.
- Toilet facility for the site working crew to be made available, including necessary transportation.
- Smoking at site is prohibited.
- Food containers, tray type is being used to keep the food packets of the site personnel. These food container trays are stored inside the air-conditioned bus to avoid food decay or contamination.
- Cool drinking water is provided to the site crew. Oral Rehydration Salt (ORS)-Prolyt is given to the site personnel during hot summer and humid working environments.
- For cold weather works, workers and supervisors involved with work in cold environments should be informed about symptoms of adverse effect exposure too cold, proper clothing, physical fitness requirements for work in cold and emergency procedures in case of cold injury.

11.0 Approval, Review and Briefing:

Approval, Review and Briefing				الموافقـة والمراجعـة والخلاصـة
HSE Manager		مدير الصحة والسلامة	Site Engineer / Services Engineer	مهندس الموقع / مهندس الخدمات
Comments		ملاحظات	Comments	ملاحظات
	الاسم Name			الاسم Name
Resident Engineer Comments				ملاحظات المهندس المقيم
ملاحظات مدير المشروع: فقط تعبىء إذا تم الإشارة على المربع المخصص أعلاه بالشخص ذات الصلة Project Manager Comments: (to be filled ONLY if the escalation box above to the relevant person is Ticked)				
Review Status (by Final Approver)				حالة المراجعة (من خلال آخر موافقة)
NO OBJECTION = A		☐		موافق
No Objection AS Noted = B		☐		موافق مع الملاحظات
REVISE & RESUBMIT = C		☐		يراجع ويعاد تقديمه
REJECTED = D		☐		مرفوض
Comments raised to PM = E		☐		ملاحضات تم رفعها لمدير المشروع
Comments				ملاحظات
	التاريخ Date		التوقيع Signature		الاسم Name

Projects Manager					مدير المشاريـع
Comments					ملاحظات
	التاريخ Date		التوقيع Signature		الاسم Name

Appendices

SN	Description
1	Bill of Quantities (BOQ)
2	Project Specifications (SPECS)
3	Contract Drawings (DWG)
4	Inspection & Test Plan (ITP)
5	Technical Data Sheet (TDS)
6	Material Safety Data Sheet (MSDS)
7	Risk Assessment (RA)
8	Test Results (TST)

1

Bill of Quantities (BOQ)

PROJECT : CMW-22021-C001	FACILITY NO. (01) - CODE 0711 EXISTING CONDITIONS	BILL 1 DIVISION 2	PAGE NO. 1/2/1

ITEM REF.		ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE	TOTAL PRICE AED
		DIVISION 2 - EXISTING CONDITIONS *Division 31 and Division 32 and all related CMW general specifications divisions are also included in this Division. Division 2, Section 02 32 00 Geotechnical Investigation - Soil Investigation work is included in External works BOQ.*				
A		**Division 31 - Earthwork**				
	1	**Excavation** Excavation required to the foundation level of the facility including compaction at the excavated levels, replacement of any soft or undesirable materials all as per the drawings and as per soil report recommendations and including excavation for apron, etc.., complete, cartaway surplus as directed and the works including shoring and dewatering if required.	985	M3	20	19,700
	2 a	**Backfilling** Backfilling required for foundations and up to the finish level of the facility with approved suitable material including compaction in layers and as shown on drawings including apron and beneath ground floor including compacted sub base layer as per the drawings.	842	M3	25	21,050
	b	Sand filling of approved material for areas as per finishing table up to the required level and including compaction as per the drawings .	89	M3	30	2,670
		Note Sand chemical stabilizing layer and sand embankment are measured in bill no. 0.				
	3	**Anti Termite Treatment** Supply and spray the soil under the ground floor slab by an approved treatment to protect the facility from termite attacks, refer note - 16 - Materials on the drawing no GN-S-0001, all as per supplier's recommendation a continuous trench around the building shall be dug and treated by the approved solution, a guarantee for the building protection for a period not less than twenty years to be provided by the contractor.		Item		10,000
		CARRIED FORWARD				53,420

2022

شركة مانكون للانشاءات ذ.م.م
MANCON CONSTRUCTION CO. L.L.C.
P.O.Box: 126636
Abu Dhabi- U.A.E.
ص.ب: ١٢٦٦٣٦
أبو ظبي - ا.ع.م

2

Project Specifications (SPECS)

B. Do not open borrow pits without approval of Engineer. Excavate borrow pits to afford adequate drainage.

3.6 FILLING AND BACKFILLING

A. Preparation of existing ground under embankments: Scarify existing ground to a depth of 150 mm. Step, bench or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with or be securely keyed to the existing material. Add 150 mm of fill material to the existing material and compact as specified in Table 3. Moisten and aerate material as necessary to provide moisture content to readily facilitate obtaining specified compaction.

B. Sub-grade preparation: When sub-grade is part fill and part excavation, scarify excavated portion to depth of 150 mm and recompact as specified for adjacent or overlying fill as specified in Table 3. Moisten or aerate material as necessary to provide moisture content to readily facilitate obtaining specified compaction with equipment used.

C. General fill: Construct fill, and embankment at locations and to lines and grades indicated. Use only approved materials in constructing fill on prepared sub-grade. Place satisfactory material in horizontal lifts not exceeding 300 mm in loose depth. Do not place material on muddy surfaces. Moisten or aerate material as necessary to provide moisture content to readily facilitate obtaining specified compaction. Compact each lift as specified in Table 3 before placing overlaying lift.

D. Weather limitations: Fill and backfill shall not be constructed when weather conditions detrimentally affect quality of finished course. Do not construct fill and backfill in rain or on saturated sub-grades. If weather conditions are windy, hot or arid, with high rate of evaporation, schedule placement in cooler portions of day and furnish equipment to add moisture to fill or backfill during and after placement.

3.7 COMPACTION

A. Compact each layer or lift of material specified so in-place density tested is not less than percentage of maximum density specified in Table 3.

TABLE 3

	Percent ASTM D1557 Maximum Density	
	Cohesive Material	Cohesion less Material
Fill, Embankment and Backfill		
Existing Ground Below Embankments	90	95
General Fill includes all fill layers under Roadways, Access Roads, Parking Lots, Runways, Taxiways, Aircraft Parking Aprons, Arm Disarm Pads and Overruns	90	95
Top 300 mm Below Pavement Structure: Runways, Taxiways, Aircraft Parking Aprons, Arm Disarm Pads and Overruns	95	100
Top 300 mm Below Pavement Structure: Under Roadways, Access Roads, and Parking Lots	95	100

3.8 FINISH OPERATIONS

A. Site grading: Grade to finished grades indicated within 30 mm. Grade areas to drain water away from structures. Existing grades which are to remain but are disturbed by Contractor's operations shall be restored.

B. Finishing sub-grades under structures and pavements: Finish surface of top lift of fill or top of sub-grade to elevation and cross section indicated. Finished surface shall be smooth and of uniform texture. Lightly scarify or blade finished surface to bring finished surface to within ±15 mm of indicated grade and to eliminate imprints made by compaction and shaping equipment. Surface shall show no deviations in excess 10 mm when tested with a 3 meter straightedge.

C. Borrow areas: Excavation and backfilling of borrow pit shall ensure proper drainage.

D. Disposition of surplus material: Remove surplus or other soil material not required or suitable for filling, or embankment from site and disposed of at approved location.

E. Protection of surfaces: Protect newly graded areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes prior to acceptance of work.

3.9 FIELD QUALITY CONTROL

A. Test Fill Layers & Sub-grade for conformance to:

1. ASTM C 136 Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D 2487 Classification of Soils for Engineering Purposes (Unified Soil Classification).
3. AASHTO M145 Classification of Soils and Soil Aggregate Mixtures for Highway Construction.
4. ASTM D 1557 Laboratory Compaction of Soils Using Modified Effort.
5. ASTM D 1883 CBR of Laboratory Compacted Soils.
6. ASTM D 4318 Liquid Limit Plastic Limit and Plasticity Index of Soils.
7. ASTM D 1140 Amount of Material in Soil Finer Than The No. 200 (0.075 mm) Sieve.

B. Perform one of each of required tests for each material to be used prior to construction for source approval. One test per lift per 1,000 m^2 until in opinion of Engineer material satisfies requirements of specification. Provide testing as directed when in opinion of Engineer material does not satisfy requirements of specification. Provide additional tests as specified above for each source change.

C. Perform density tests in randomly selected locations using ASTM D1556 ASTM D2922 and ASTM D3017 as follows: One test per 2000 square meters in each layer of lift and every 1,000 square meters in sub-grade cut. Determine moisture content of soil material in place at every location where in-place density is tested. Where ASTM D2922 and ASTM D3017 are used to test field compaction densities, verify results of tests by performing at least 1 test per day using ASTM D1556 at location already tested by ASTM D2922 and at least 1 additional test using ASTM D1556 for every 10 tests performed with nuclear device, also at locations already checked by ASTM D2922.

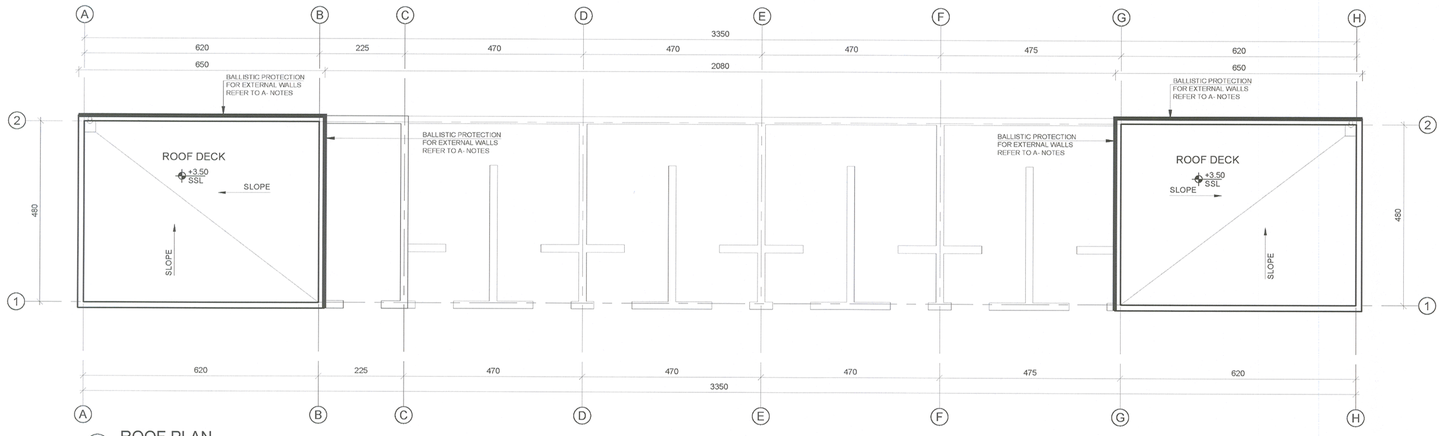
D. Successive lifts will not be allowed to be placed until current lift has been accepted by Engineer.

END OF SECTION

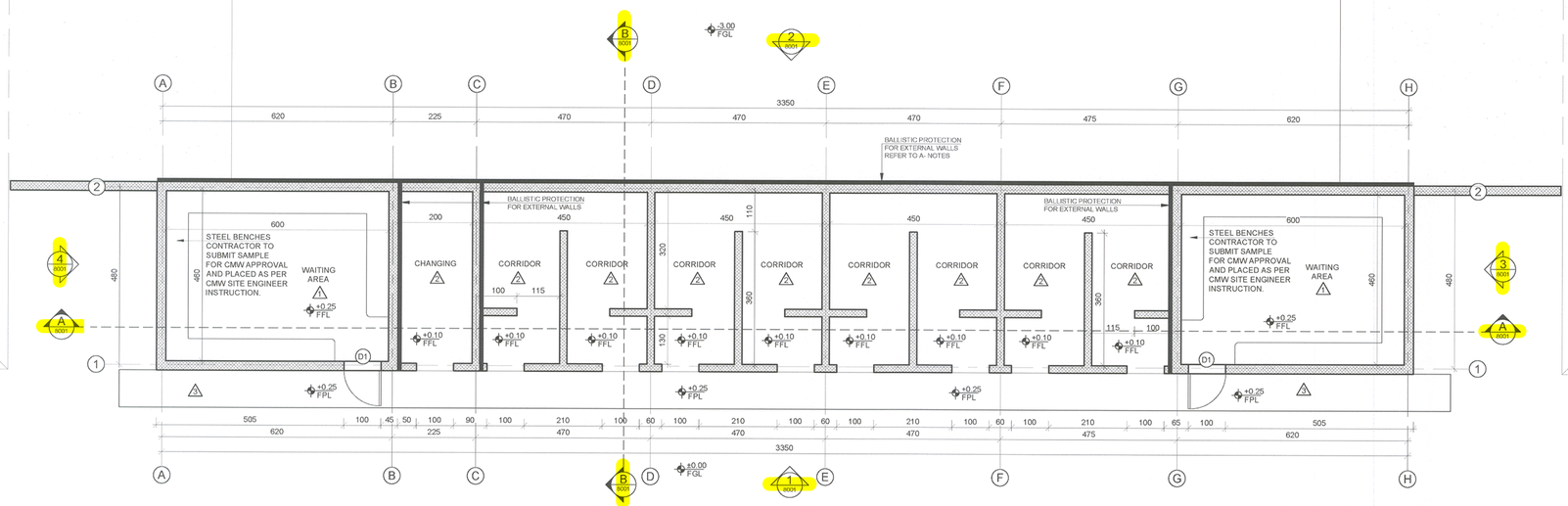
Contract Section Project Management Dept Command Of Military Works

3

Contract Drawings (DWG)



2 ROOF PLAN
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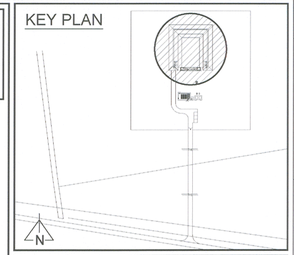


1 GROUND FLOOR PLAN
Scale: 1:75

RAIN WATER DISCHARGE:-

ALL RAIN WATER POINTS SHALL BE OF 30X30CM. RAIN WATER OUTLETS AND "4INCH Ø" PVC RAIN WATER DOWN PIPES. RAIN WATER PIPES FROM ROOF TO THE GROUND TO BE CONNECTED NEAREST DRAINAGE. POINT OR FREE DISCHARGE AND DOWN PIPES EMBEDDED STRICTLY NOT TO BE EXPOSED ON THE EXTERNAL FACADES WALLS , AS PER CMW ENGINEER INSTRUCTIONS.

KEY PLAN



NOTES:

1. GENERAL NOTES, SCHEDULE OF FINISHES AND TYPICAL DETAILS REFER TO DRAWING NO. CMW-22021-C001-GN-A-0001, 0002 & 0003
2. DO NOT SCALE FROM THE DRAWINGS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND ALL RELEVANT SECTIONS OF THE SPECIFICATIONS.
4. ALL SERVICES CUT-OUTS, EQUIPMENTS & EQUIPMENTS PLINTH ARE SHOWN INDICATIVE ONLY: CONTRACTOR TO COORDINATE THESE WITH THE SERVICES & STRUCTURAL DRAWINGS.

ABBREVIATIONS:-

FFL	:	FINISHED FLOOR LEVEL
SSL	:	STRUCTURAL SLAB LEVEL
FPL	:	FINISHED PAVEMENT LEVEL
FRL	:	FINISHED ROAD LEVEL
TOPR	:	TOP OF PARAPET

LEGEND

BALLISTIC PROTECTION FOR EXTERNAL WALLS

A- NOTES FOR BALLISTIC PROTECTION FOR EXTERNAL WALLS

REGUPOL ELASTIC TILES OF PUR-BONDED HIGH QUALITY RUBBER FIBERS BY BSW OR EQUIVALENT.
BALLISTIC PROTECTION: WALL ELEMENTS
- RELIABLY PREVENTS THE PROJECTILES, THAT PENETRATE THEM,FROM REBOUNDING BACK.
- FEATURES INCLUDE HIGH WEAR RESISTANCE, WEATHER RESISTANCE AND SOUND DEADENING QUALITIES.
- IDEAL FOR BOTH INDOOR AND OUTDOOR APPLICATION.
- **SIZE** - 1.000 x 500mm PER TILE +/- 1%
- **THICKNESS** - 43mm +/- 2mm
- **WEIGHT** - APPROXIMATELY 35kg/m²
- **COLOR** - RED-BROWN, GREEN, BLACK & GREY.
- **INSTALLATION** - SCREWED OR NAILED ONTO WOODEN STRIPS.
- FIRE CLASSIFICATION - DIN 4102-B2
- **SOUND INSULATION** - TEST REPORT FROM THE INSTITUTE FOR SOUND AND THERMAL INSULATION IN ESSEN, ACC. TO DIN 52212.

FINISHES TABLE

SPACE CODE(Refer to Plans Drawings)	SPACE TITLE(S)	CATEGORY	FLOORS							WALLS			CEILING					SKIRTING			
		TYPE	GRANITE	MARBLE	CERAMIC	SAND FILLING	TERRAZZO FLOORING	CONCRETE FLOORING	INTERLOCK	EMULSION PAINT	DARK COLORED PAINT	CERAMIC TILE	TYROLEAN EXTERNAL PAINT	ALUMINUM TILE	DARK COLORED PAINT	PLASTER AND PAINTED.	GYPSUM BOARD	AS PER EXTERNAL FINISHES	GRANITE SKIRTING	MARBLE SKIRTING	CERAMIC SKIRTING	TERRAZZO SKIRTING
		TYPE	GRAN	MAR	CER	SAND	TER	CON	INT	EMP	DCP	CER	TYR	ALU-1	DCP	CIL	FC-1	EXT	GRAN-S	MAR-S	CER-S	TER-S
1	WAITING AREA							●		●						●						●
2	CHANGING ROOM, CORRIDOR				●								●									
3	APRON								●													

NOTE: EMULSION PAINT ON FAIR FACE CONCRETE (WITHOUT PLASTER).

REV NO	Description	DATE	DRAWN	CHK
00	CONSTRUCTION DOCUMENT	05/22	MIT	MK

PURPOSE OF ISSUE	DESIGN STAGE
TYPE OF DOCUMENTS	CONSTRUCTION DOCUMENT

CLIENT
COMMAND OF MILITARY WORKS
P.O.Box.....Abu Dhabi
United Arab Emirates
Tel.....
Fax No: .....

DESIGN CONSULTANT:

CONTRACTOR:

DRAWING TITLE:
GROUND FLOOR AND ROOF PLAN

DESIGNER / REVIEWER (1)		REVIEWER (2)	
MK		MM	

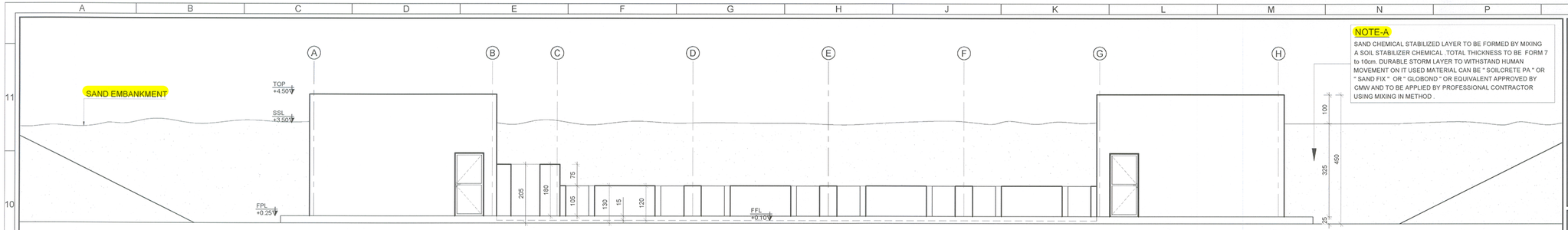
DRAUGHTSMAN	DATE	SCALE
MIT	05/22	1 : 75

APPROVED BY:-
HEAD OF SECTION

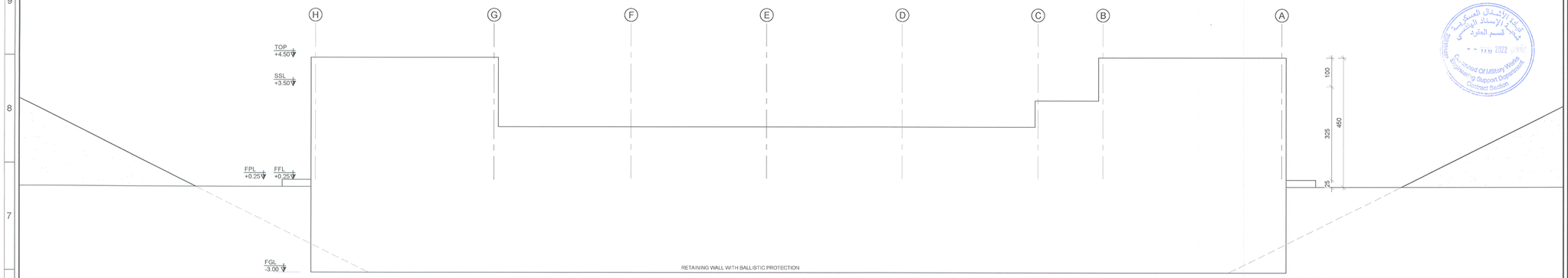
PROJECT NO.	CAMP ID	FACILITY CODE
22021	141291	0711

DRAWING NO.	REVISION No.
CMW-22021-C001-01-A-2001	00

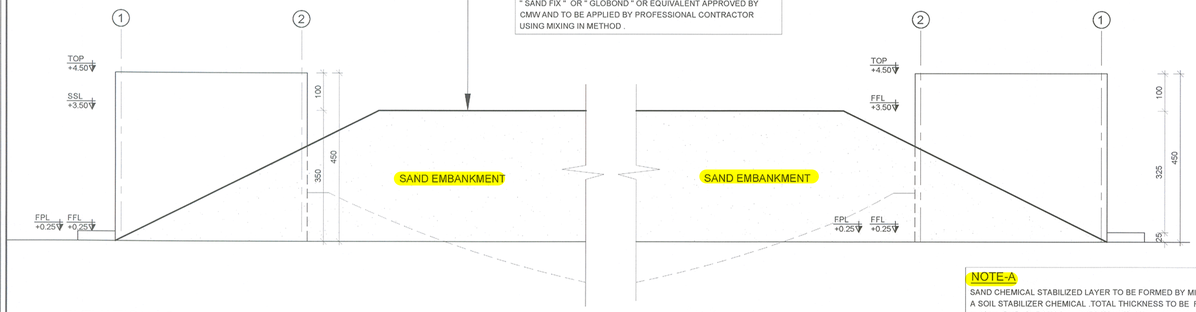
Approved
Command Of Military Works
Engineering Support Department
Contract Section
14 DEC 2022
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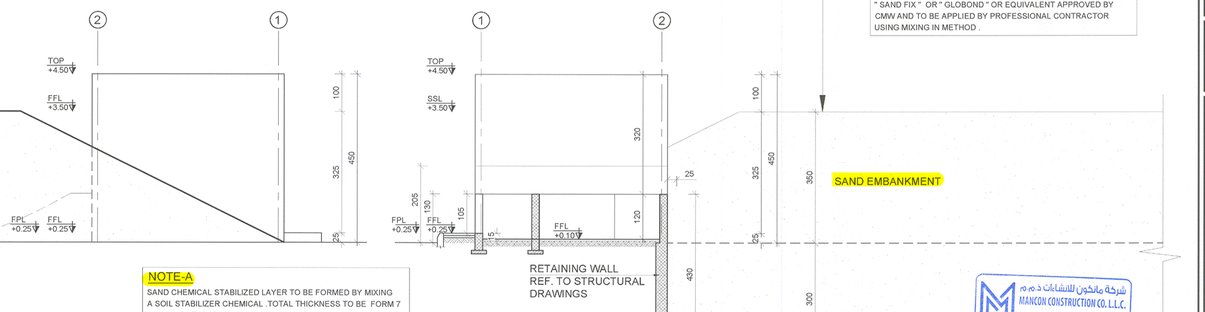
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2 ELEVATION - 2
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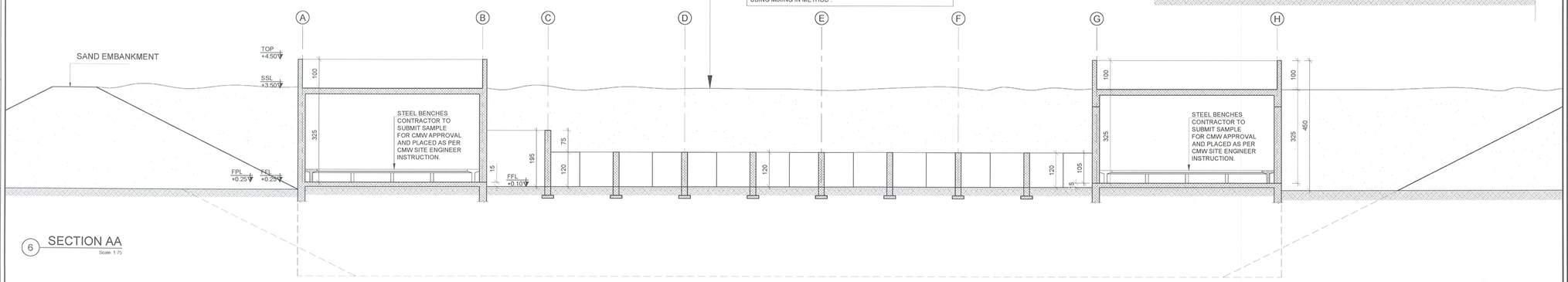


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4 ELEVATION - 4
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5 SECTION BB
Scale: 1:75



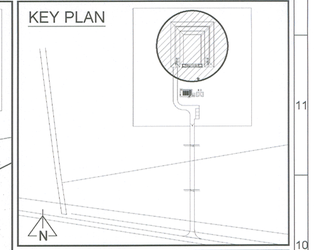
6 SECTION AA
Scale: 1:75

NOTE-A
SAND CHEMICAL STABILIZED LAYER TO BE FORMED BY MIXING A SOIL STABILIZER CHEMICAL .TOTAL THICKNESS TO BE FORM 7 to 10cm. DURABLE STORM LAYER TO WITHSTAND HUMAN MOVEMENT ON IT USED MATERIAL CAN BE " SOILCRETE PA " OR " SAND FIX " OR " GLOBOND " OR EQUIVALENT APPROVED BY CMW AND TO BE APPLIED BY PROFESSIONAL CONTRACTOR USING MIXING IN METHOD .

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KEY PLAN

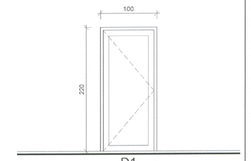


NOTES:

1. GENERAL NOTES, SCHEDULE OF FINISHES AND TYPICAL DETAILS REFER TO DRAWING NO. CMW-22021-C001-GN-A-0001, 0002 & 0003
2. DO NOT SCALE FROM THE DRAWINGS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OTHER RELEVANT ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND ALL RELEVANT SECTIONS OF THE SPECIFICATIONS.
4. ALL SERVICES CUT-OUTS, EQUIPMENTS & EQUIPMENTS PLINTH ARE SHOWN INDICATIVE ONLY: CONTRACTOR TO COORDINATE THESE WITH THE SERVICES & STRUCTURAL DRAWINGS.

SCHEDULE OF DOORS AND WINDOWS

(SCALE 1 : 50)



D1

ALUMINUM FRAMED SINGLE SHUTTER SIDE HINGED ALUMINUM SANDWICH PANEL FLUSH DOOR AS SHOWN. COMPLETE WITH ALL NECESSARY IRONMONGERY. REFER GENERAL SHEETS FOR DETAILS.

REV NO.	Description	DATE	DRAWN	CHK
00	CONSTRUCTION DOCUMENT	05/22	MIT	MK

PURPOSE OF ISSUE	DESIGN STAGE
TYPE OF DOCUMENTS	CONSTRUCTION DOCUMENT

CLIENT

COMMAND OF MILITARY WORKS
P.O.Box.....Abu Dhabi
United Arab Emirates
Tel.....
Fax No: .....

DESIGN CONSULTANT:

CONTRACTOR:

DRAWING TITLE:
ELEVATIONS, SECTIONS AND DETAILS

DESIGNER / REVIEWER (1)		REVIEWER (2)	
MK		MM	

DRAUGHTSMAN	DATE	SCALE
MIT	05/22	1 : 75

APPROVED BY:-
HEAD OF SECTION

PROJECT NO.	CAMP ID	FACILITY CODE
22021	141291	0711

DRAWING NO.	REVISION No.
CMW-22021-C001-01-A-8001	00

ALL RIGHTS RESERVED. NO PART OF THIS DRAWING MAY BE REPRODUCED OR TRANSMITTED IN ANY MEANS WITHOUT WRITTEN PERMISSION OF THE COPYRIGHT HOLDER

4

Inspection & Test Plan (ITP)

Reference No رقم المرجع			UAE ARMED FORCES	القوات المسلحة لدولة الامارات العربية المتحدة
ITP	C	0001	COMMAND OF MILITARY WORKS	قيادة الأشغال العسكرية
الطبعة Rev	Date التاريخ		خطـة الفحـص والتفتيـش	
00	15-3-2023		INSPECTION AND TEST PLAN	

CMW-22021-C001-ITP-C-0001	Full	مرجع الوثيقة الكامل Document Reference	C001	-	22021	رقم العقد Contract No
MISCELLANEOUS FACILITIES FOR LAND-FORCE , AL HAMRA- ABU DHABI						إسم العقد Contract Name

المرفقات ا لمخططات Attach Drawings	الرمز Code	جهة التفتيش Inspection Party	التفتيش Inspection		وثيقة الإثبات Verifying Document		المواصفات المرجعية .Controlling Spec	نشاط Activity	مادة Item
			التكرار Frequency	الطريقة/بواسطة من Method/by Whom	رقم التقديم # Submittal	الوصف Description			
								Soil Stabilizing Activity:	
								Submittal Approvals:	**1**
	A	CMW Engineer	Once	Doc. / Engr	MTS-C-13-R1	Material Submittal	3120 00	Material Approval	1.1
CMW-22063-C001-01-A-3001	A	CMW Engineer	Once	Doc. / Engr		Shop Drawing	3120 00	Shop Drawing Approval	1.2
	A	CMW Engineer	Once	Doc / Engr	DS-06	Method Statement	3120 00	Method Statement	1.3
								Pre-Work:	**2**
	I	CMW Engineer	100%	Dimensional / Engineer		Shop Drawing	3120 00	Slope Ratio	2.1
	i	CMW Engineer	100%	Test / Engineer	DS-06	Method Statement	3120 00	Comapction Test	2.2
								Work:	**3**
	I	CMW Engineer	100%	Visual, Dimensional / Engineer	DS-07	Method Statement	3120 00	Holes (Size & Spacing)	3.1
	I	CMW Engineer	100%	Visual / Engr.	DS-07	Method Statement	3120 00	Dilute Stabilizer Material	3.2
	I	CMW Engineer	100%	Visual / Engr.	DS-07	Method Statement	3120 00	Spray Rate	3.3
	I	CMW Engineer	100%	Visual / Engr.	DS-07	Method Statement	3120 00	Corner Curve	3.4
	I	CMW Engineer	100%	Visual / Engr.	DS-07	Method Statement	3120 00	Random Backfill	3.5
	I	CMW Engineer	100%	Document / Engineer	DS-07	Method Statement	3120 00	Final Approval	3.6

Notes for Completion of the ITP				**ملاحظات لإتمام خطة التفتيش والإختبار**
تكرار نشاط التفتيش مثال: كل عمود, 10 %	**التكرار**	الأنشطة الرئيسية التي يجب أن تنجز	**النشاط**	
Frequency of inspection activity e.g. each column, 10% etc	**Frequency**	Principal activities to be carried out	**Activity**	
يجب إستخدام الوثائق لتسجيل النتائج والموافقة	**التحقق من الوثيقة**	الرجوع إلى المواصفات ذات الصلة, أسلوب البيان, المخططات إلخ...	**المواصفات المسيطرة**	
Document to be used to record results and acceptability	**Verifying Document**	Ref to relevant Specs, MS, Drawings, etc.	**Control Spec.**	
جهة التقتيش والرمز : H= إيقاف, N= إعلام, I= تفتيش أو A= موافقة	**مسؤول التفتيش والرمز**	مثال: بصري, الأبعاد, الإختبار وبواسطة من مثل: المهندس, رئيس العمال	**طريقة التفتيش**	
Inspection party and code as H=Hold, N=Notification, I=Inspection or A=Approval	**Inspect. Auth & Code**	e.g. visual, dimensional, test & by whom e.g. Engineer, Foreman	**Inspection Method**	

5

Technical Data Sheet (MTS)

Reference No رقم المرجع	UAE ARMED FORCES القوات المسلحة لدولة الامارات العربية المتحدة
MTS C 0013	COMMAND OF MILITARY WORKS قيادة الأشغال العسكرية
Rev. الطبعة 01 — Date التاريخ 26-Jan-23	**طلـــب إعتمـــاد مـــــواد** **MATERIAL SUBMITTAL**

CMW-22021-C001-MTS-C-0013	مرجـــع الوثيقـــة الكامـــل Full Document Reference	C001 - 22021	رقم العقد Contract No.
CONSTRUCTION OF SHOOTING AT ZAYED MILITARY CITY			إسم العقد Contract Name
COMMAND OF MILITARY WORKS	To إلى	MANCON CONSTRUCTION CO.LLC	From من
SOIL STABLIZER (SAND FIX)			SUBMITTAL TITLE عنوان التقديم

ALL	منطقة Zone	ALL	مستوى الطابق F. Level	ALL	المنشأة Facility
07 00 00	CSI ID	CMW-22021.6.10	WBS ID	CIV	التخصص Discipline

المطابقة Compliance ◉ متوافقة مع وثائق العقد Complies with Contract documents ○ بديل (إرفق الوثائق الداعمة) Alternative (attach support documents)

عينة Sample ☐ قدمت Provided ☑ لم تقدم Not Provided

رقم Ser.	الشرح الكامل / الأحجام / التفاصيل Full Description / Sizes / Details	رقم جدول الكميات / المواصفات / المخططات Ref to BOQ / Specs / Dwgs	الحالة Status
1	(1) SODAMCO (Soilex.200)		
2	(2)EMIRATES SPECIALITIES (Sandfix-C)		
3	(3) COLMEF (Consoil)		
	Attached: TECHNICAL SUBMITTAL		

يجب على المقاول أن يشهد بأن كل المعلومات التي أصدرت تحت هذا التقديم قد تم مراجعتها والتحقق منها ووجدت مطابقة مع وثائق العقد ما لم يتم التأشير عليها أعلاه بأنها بديل مع توضيح سبب إستبدال المواد التعاقدية. الحالة يجب تعطى بواسطة المراجع الأخير.

The Contractor certifies that all information issued under this Submittal have been reviewed and verified and found to be in compliance with the Contract documents unless ticked as "Alternative" above with explaining the reason of replacing the contractual Materials. To be filled by the FINAL Reviewer ONLY using the key Code below*

أنشأت من قبل

الأسم Name	التوقيع Signature	التاريخ Date	Issuer STAMP
Engr. AHMAD ASHRAF		26/Jan/23	

شركة مانكون للانشاءات ش.م.ح MANCON CONSTRUCTION CO. L.L.C. P.O.Box: 120835 Abu Dhabi

ملاحظات و مراجعة التقديم

SUBMITTAL REVIEW & COMMENTS

الأسم Name	التوقيع Signature	التاريخ Date	Site Engineer / Consultant Site Engineer مهندس الموقع / مهندس الموقع للإ ستشاري

الأسم Name	التوقيع Signature	التاريخ Date	Specialist Engineer / Specialist Committee المهندس المختص / اللجنة المختصة

حالة المراجعة (من خلال آخر موافق) Review Status (by Final Approver)	موافق A = NO OBJECTION	موافق مع الملاحظات B = NO OBJECTION AS NOTED	يراجع و يعاد تقديمة C = REVISE & RESUBMIT	مرفوض D = REJECTED
	☐	☑	☐	☐

الأسم Name	التوقيع Signature	التاريخ Date
		7-1-2023
		3/2/2023
		03/02/2023

للمقـــاول بالإستلام CONTRACTOR'S RECEIPT

ختم الإستلام Receiver STAMP	التاريخ Date	التوقيع Signature	الأسم Name

يجب أن يتم تعبئة كافة البيانات باللغة العربية
All details must be filled in Arabic

Soil Stabilization Materials Factory

Sandfix,..With its wide of products serves the people better in the constructions of Road, Buildings, Water proofing & Soil Stabilization work.

more

SANDFIX C

DESCRIPTION
Sandfix-c is prepared from concentrated solution of polymer modified styrene acrylic copolymer resin with specially designed plasticizer, it can control the soil from strong drifting sand dunes and stabilize unpaved plant areas.

SPECIAL FEATUARES
Being an excellent tackifier, it shows outstanding properties to resist to erosion due to water, wind and other environmental condition. It contains special wetting agent gives excellent penetration and greater stability on surfaces.

APPLICATION
- Erosion and dust control of highway embankments and pipeline embakments.
- Stabilization of open desert sand for the purpose of suppressing sand storm.
- Hydro seeding and landscaping.
- Dust control on construction sites and in military areas.
- Prevention load bearing strength of all types of soil.
- Sandfix-c has the ability to maintain stability and density of treated soils when compacted.

PREPARATION
Dilution water should be potable water and should not contain more than 20,000 ppm of salt. Sanfix-c is applied in different techniques and coverage rates depends on the site requirements, meteorological conditions, and nature of soils. The stabilization technique of sand dunes is different from stabilization of haulage or road shoulder.

PHYSICAL PROPERTIES
APPEARANCE : FREE FLOWING MILKY VISCOUS LIQUID
SOLUBILITY IN WATER : EASILY MISCIBLE WITH WATER IN ALL RATIO
FLASH POINT : NON-FLAMMABLE
TOXICITY : NON-TOXIC
ENVIRONMENTAL COMPATIBILITY : ECOLOGICALLY HARMLESS
SPECIFIC GRAVITY : 1

ADVANTAGES
Sandfix-c is approved and recommended by government authorities and being used in different projects. Stabilization materials is a concentrated salutation of special grade of acrylic resin blended with special plasticiters, which can tolerate the extreme climatic conditions. It resists corrosive atmosphere and ground water environment. It remains unaffected with the temperature and humidity range prevailing of the middle east. It can withstand wind velocity up to 130 km/hour under sand storm it is colorless transparent, it blends with sand gives light color and protect the desert environmental. It has excellent environmental protection properties so it is easily applicable to the gulf extreme climate.

SPRAY EQUIPMENT
Very large desert areas use always the terragator. Medium large areas. Can use hydro seeder or water truck with special spray nozzles.

SMALL AREA
A. A tank with light starer
B. A non clogging pump
C. Spray hoses and fire hose type nozzles.

COVERAGE RATES
Sandfix-c is mixed with water and through blended in the tank before spraying. In general 1-liter of sandfix-c should dissolve in 6 liters of fresh water and 7 liters should be applied. Other dilution factors may only be advised for special cases after approval and consultancy of our technical department. Above coverage rates are recommended for general application and guide lines, but the actual coverage rates can be decided after the observation of the site condition and types of soil or dune sand available.

STORAGE
Store under shade. Avoid freezing temperature.

SHELF LIFE
A minimum of 12 months in sealed containers, under recommended storage condition.

CLEANING
Clean all tools, pump, hose, nozzle, tank etc by rinsing with water before sandfix-c dries. If dried, remove by scraping followed by rinsing with a proper solvent.

PRECAUTIONS
Sandfix-c is non-flammable and non-hazardous in normal use.

SKIN CONTACT
The product should be removed from the skin by soap and water when wet; and if dried, use appropriate hand cleanser.

EYE CONTACT
In case of contact with eyes, rinse them immediately with plenty of clean water.

PACKING
Sandfix-c is supplied in 20 liters pail, 200 liters barrels and bulk supply.

Sandfix technical team is available for any consult and clarification.

6

Material Safety Data Sheet (MSDS)

Material Safety Data Sheet

SANDFIX-C

SECTION 1 - PRODUCT IDENTIFICATION

Product Name : Sandfix-C
Chemical nature : Polymer
Chemical Family : Styrene Acrylic Resin

SECTION 2 - HAZARDS IDENTIFICATION

Major Route(s) of Entry: Inhalation, Skin, Eyes, Ingestion.

Signs and Symptoms of Acute Exposure

Eye Contact: This material may cause irritation with tearing, redness, or a stinging feeling. Effects may become more serious with prolonged contact.

Skin Contact: May cause irritation with redness and itching or burning feeling. Skin contact may cause harmful effects in other parts of the body. Effects may become more serious with prolonged contact.

Inhalation: May irritate the mucous membrane and respiratory tract.

Ingestion: May result in Gastric Disturbances. If swallowed in large quantities, this material can obstruct the intestine. And may affect vital organs.

Medical Conditions Aggravated By Exposure:
Skin contact may aggravate existing dermatitis.

SECTION 3 - PRODUCT COMPOSITION

Polymer
Plasticizer
additives

SECTION 4 - FIRST AID MEASURES

Get immediate medical attention for any significant overexposure.
Inhalation : Leave area to breathe fresh air. Avoid further overexposure. If symptoms persist, get medical attention.
Eye contact: Flush with water for at least 15 minutes while holding eye lids apart. Get medical attention immediately.
Skin contact: Clean area of contact thoroughly using soap and water. If irritation, rash or other disorders develop, get medical attention immediately.
Ingestion : Dilute with water. Do not induce vomiting unless advised by a physician. Call nearest Poison Control Center or Physician immediately.

SECTION 5 - FIRE FIGHTING MEASURES

Flash point : N/A
Lower explosion limit : Not available.
Upper explosion limit : Not available.
Auto ignition temperature: N/A
Extinguishing media : Water spray (fog), carbon dioxide, dry chemical or foam.
Protective equipment for firefighters: Use accepted fire fighting techniques. Wear full firefighting protective clothing, including self-contained breathing apparatus (SCBA).
Fire and explosion conditions: Unusual fire and explosion hazards will not occur with normal use.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill disposal method as with any plastic based product. Do not incinerate. Use appropriate protective equipment. Avoid contact with material. Stop flow of material if safe to do so. Contain spill and keep out of water courses. Ventilate area.

SECTION 7 - HANDLING AND STORAGE

Prevent inhalation of vapor, ingestion, and contact with skin eyes and clothing. Keep container closed when not in use. Precautions also apply to emptied containers. Personal protective equipment must be worn during maintenance or repair of contaminated mixer, reactor, or other equipment. Store under dry warehouse conditions.
Shelf life of one year if container is tightly closed and no leak.

SECTION 8 - PERSONAL PROTECTION

Personal protection equipment
Respiratory protection : Wear appropriate face masks. Follow manufacturer's directions for respirator use.

Hand protection: Use suitable impervious gloves and protective apparel to reduce exposure.
Eye protection: Wear appropriate eye protection. Wear chemical safety goggles and/or face shield to prevent eye contact. Do not wear contact lenses. Do not touch eyes with contaminated body parts or materials. Have eye washing facilities readily available.
Skin and body protection: Prevent contact with shoes and clothing.
Protective measures: Use professional judgment in the selection, care, and use. Inspect and replace equipment at regular intervals.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Form	:	Liquid
Color	:	White to Light Yellow
Odor	:	Plastic like
pH	:	Neutral to Alkaline
Vapour pressure	:	Not available.
Melting point/range	:	Not available.
Freezing point.	:	Not available.

SECTION 10 - REACTIVITY / STABILITY

Substances to avoid	:	None
Stability	:	Material is stable under normal storage, handling, and use.
Hazardous polymerization	:	None

SECTION 11 - TOXICOLOGICAL INFORMATION

No Data Available

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICITY: Spills into waterways may be harmful to benthic organisms and bottom feeders.
ENVIRONMENTAL FATE: This material is not expected to present an environmental problem.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste disposal method as with any plastic based product. Do not incinerate. Waste compound must not be discharged into drains or water ways. Disposal of product, solid waste and packaging should always comply with local or national regulation, and should be undertaken by authorized contractor.

SECTION 14 - TRANSPORTATION / SHIPPING DATA

The product is not classified as dangerous for conveyance.

SECTION 15 - OTHER INFORMATION

This information is based on our current knowledge and is intended to describe the product for purpose of health, safety and environmental requirements only. It should therefore be not construed as guaranteeing any specific property of the product.

The product is intended only for commercial/industrial processing or application.

Issued by :
Technical Department
Soil Stabilization Materials Factory – Sandfix

7

Risk Assessment (RA)

M/S MANCON CONSTRUCTION CO. LLC	PROJECT HEALTH, SAFETY & ENVIRONMENTAL RISK ASSESSMENT APPENDIX 1 – METHOD STATEMENT	UAE ARMED FORCES Command of Military Works (CMW)
Doc Ref: CMW-22021-C01-MS-C-0001	Activity: Sand Backfilling, Compaction & Application of Soil Stabilizer (Sandfix-C / Sandfix-CM)	Rev: 00 | Date: 15-Mar-2023

Client:	UAE Armed Forces – Command of Military Works (CMW)	**Contract No.:**	CMW-22021-C001
Project:	Construction of Shooting at Zayed Military City (Facility-01)	**Contractor:**	M/S Mancon Construction Co. LLC
Reference Docs:	MS CMW-22021-C01-MS-C-0001, Sandfix-C MSDS, Sandfix-CM TDS	**Prepared By:**	Saad UL Islam / HSE Department

TECHNICAL & COMPLIANCE NOTE: Method Statement specifies Sandfix-C diluted at 16% with water (1 L/m²), whereas the TDS covers Sandfix-CM (1:3 dilution with potable water < 20,000 ppm salinity). Confirm approved grade and dilution ratio with CMW Engineer and Soil Stabilization Materials Factory prior to mixing. Store containers under shade in dry conditions, tightly closed, and verify 12-month shelf life.

RISK MATRIX KEY (R = L × S): Likelihood (L): 1=Rare, 2=Unlikely, 3=Possible, 4=Likely, 5=Almost Certain | Severity (S): 1=Insignificant, 2=Minor, 3=Moderate, 4=Major, 5=Catastrophic | Risk Rating: 1–4 (LOW), 5–9 (MEDIUM), 10–16 (HIGH), 17–25 (EXTREME)

Item / Activity	Hazards Identified	Who / What Might Be Harmed	Initial Risk (L×S=R)	Control Measures (MS & MSDS/TDS Aligned)	Residual Risk (L×S=R)	Action By
1. Pre-Works, Permits & Site Mobilization	• Unauthorized work • Unaware personnel • Contact with existing utilities/services	• Site crew • Visitors • Infrastructure	**3 × 4 = 12 (HIGH)**	• Apply and collect required permits at least 24 hours before commencing work. • Conduct daily task-specific Toolbox Talks (TBT) covering MS and Sandfix-C MSDS. • Deploy only skilled, certified, and authorized personnel. • Enforce mandatory PPE (helmet, safety shoes, reflective jacket) for all crew and visitors.	**1 × 4 = 4 (LOW)**	Site Engineer / HSE Officer
2. Heavy Equipment & Vehicle Operations (Long Boom Excavator, Shovel 966, Bobcat, Rollers)	• Struck by moving machinery • Blind spot collisions • Vehicle overturn on slopes • Road crossing accidents	• Ground crew • Operators • Inspecting engineers	**4 × 5 = 20 (EXTREME)**	• Assign trained flagmen/banksmen for all reversing operations and road crossings. • Enforce strict traffic management, designated vehicle parking, and pedestrian segregation. • Verify valid third-party inspection certificates and operator licenses. • Ensure functional reverse alarms and flashing beacons on all plant.	**2 × 4 = 8 (MEDIUM)**	Site Supervisor / Flagmen
3. Sand Backfilling & Slope Forming (Facility-01 Shooting Range)	• Slope failure / sand sliding • Excavation collapse • Dust inhalation	• Ground crew • Lab technicians • Operators	**3 × 5 = 15 (HIGH)**	• Strictly maintain safe slope angle not exceeding 26° (calculated from 39° soil friction angle). • Widen backfill footprint from 12.7m to 14.6m to ensure slope stability. • Place sand fill in max 300mm layers and compact to minimum 95% density. • Perform water spraying for dust suppression during earthworks.	**1 × 4 = 4 (LOW)**	Site Engineer / Foreman

Item / Activity	Hazards Identified	Who / What Might Be Harmed	Initial Risk (L×S=R)	Control Measures (MS & MSDS/TDS Aligned)	Residual Risk (L×S=R)	Action By
4. Soil Compaction & Field Density Testing (FDT) (966 Roller, Plate Compactor)	• Hand-arm vibration (HAVS) • High noise levels • Crushing / foot injury • Nuclear gauge radiation (if used)	• Compactor operators • Approved lab technicians	**3 × 3 = 9 (MEDIUM)**	• Rotate operators using plate compactors to limit hand-arm vibration exposure. • Provide hearing protection (earplugs/earmuffs) in high-noise zones. • Suspend heavy machinery movement in the immediate zone during In-Situ FDT testing. • Enforce radiation exclusion zones if nuclear density gauges are used.	**1 × 3 = 3 (LOW)**	Foreman / Lab Technician
5. Drilling / Making Staggered Holes (20mm dia × 150mm depth at 800mm spacing)	• Hand/arm injuries from tools • Musculoskeletal strain • Slips/trips on sloped sand	• Operatives	**3 × 3 = 9 (MEDIUM)**	• Inspect hand tools/augers prior to use; ensure proper grips and guards. • Train workers on safe manual handling and ergonomic posture. • Work systematically with secure footing on the 26° slope.	**1 × 3 = 3 (LOW)**	Site Foreman
6. Handling, Mixing & Storage of Sandfix-C (Styrene Acrylic Resin; 16% dilution, 10 min mixing)	• Eye contact: Irritation, tearing, redness, stinging • Skin contact: Redness, itching, burning, aggravation of dermatitis • Inhalation: Respiratory/mucous membrane irritation • Ingestion: Gastric disturbance, intestinal obstruction	• Mixing crew • Maintenance staff	**4 × 3 = 12 (HIGH)**	• Eye Protection: Wear chemical safety goggles and/or face shield; DO NOT wear contact lenses. Keep emergency eyewash readily available. • Skin/Hand Protection: Wear impervious chemical-resistant gloves, protective coveralls, and closed footwear. • Respiratory: Wear appropriate face masks/respirators during mixing. • Hygiene: Prohibit eating, drinking, or smoking near chemical mixing areas. Wash hands thoroughly with soap and water. • Maintenance: Wear full PPE when cleaning or repairing contaminated mixers, pumps, and hoses.	**1 × 3 = 3 (LOW)**	HSE Officer / Site Supervisor
7. Spraying & Injecting Diluted Stabilizer (1L/hole & 1L/m² via spray gun/pump)	• Chemical mist drift in wind • High-pressure hose/nozzle whip or clog • Slippery wet polymer surfaces • Dried resin skin/eye contact during cleanup	• Spray gun operators • Nearby workers	**4 × 3 = 12 (HIGH)**	• Apply only in suitable weather conditions; stop spraying during high winds. • Check all pump connections, hoses, and non-clogging nozzles before pressurizing. • Rinse tools, pumps, hoses, and tanks with water BEFORE product dries (scrape and use approved solvent only if dried). • Cordon off freshly sprayed slopes until cured to prevent slips and surface damage.	**1 × 3 = 3 (LOW)**	Site Supervisor / Foreman
8. Spill Control, Waste Disposal & Environmental Protection	• Waterway/drain contamination (harmful to benthic organisms) • Improper disposal of plastic-based waste/drums	• Environment • Marine & groundwater ecosystems	**3 × 3 = 9 (MEDIUM)**	• Keep spills and wash water strictly out of drains and waterways. • Contain spills immediately using sand/absorbent material and ventilate area. • Treat waste compound and empty containers as plastic-based waste; DO NOT incinerate. • Dispose of waste and packaging through a CMW/Tadweer-authorized waste contractor.	**1 × 3 = 3 (LOW)**	HSE Officer / Site Engineer
9. Adverse Weather & Worker Welfare (UAE Summer Heat / Winter Cold)	• Heat exhaustion, heat stroke, dehydration • Cold stress in winter • Food spoilage/contamination	• All site personnel	**4 × 4 = 16 (HIGH)**	• Strictly comply with the UAE Summer Midday Break regulation. • Provide shaded rest areas, umbrellas, and air-conditioned buses/pickups. • Supply cool drinking water and Oral Rehydration Salts (ORS-Prolyt). • Store food trays inside air-conditioned vehicles to prevent spoilage. • Brief crew on cold-weather protection and symptoms during winter operations.	**1 × 4 = 4 (LOW)**	HSE Officer / Foreman

EYE CONTACT (MSDS Sec 4)	SKIN CONTACT (MSDS Sec 4)	INHALATION (MSDS Sec 4)	INGESTION (MSDS Sec 4)	FIRE FIGHTING (MSDS Sec 5)
Flush immediately with plenty of clean water for at least 15 minutes while holding eyelids apart. Get immediate medical attention.	Wash area thoroughly with soap and water while wet. If dried on skin, use appropriate hand cleanser. Seek medical attention if rash/irritation develops.	Leave area to breathe fresh air immediately. Avoid further overexposure. Get medical attention if symptoms persist.	Dilute with water. DO NOT induce vomiting unless advised by a physician. Call Poison Control Center or Physician immediately.	Non-flammable in normal use. If involved in fire, use water spray (fog), CO_2, dry chemical, or foam. Wear SCBA and full protective gear.

UAE EMERGENCY SERVICES: Ambulance: 998 | Police: 999 | Civil Defence (Fire): 997			
Prepared By (Site Engineer)	**Reviewed By (HSE Manager)**	**Approved By (Project Manager)**	**Client / Consultant Approval (CMW)**
Name: Signature: Date:	Name: Signature: Date:	Name: Signature: Date:	Name: Signature: Date:

8

Test Results (TST)

مختبرات بينونه
شركة شخص الواحد ذ.م.م. • رأس المال المدفوع ٥٠,٠٠٠ درهم
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TEST REPORT FOR DIRECT SHEAR

Customer : **MANCON CONSTRUCTION LLC**
Abu Dhabi, UAE (Tel: 02 –6444004 Fax: 02-6446404)

Ref: **AUH.23.ST.114** Rev: 0
Date: 08 March 2023

Project : CMW-22021-C001 (CAP-255)
Location : Zayed Military City, Abu Dhabi
Owner : UAE Armed Forces
Consultant : CMW

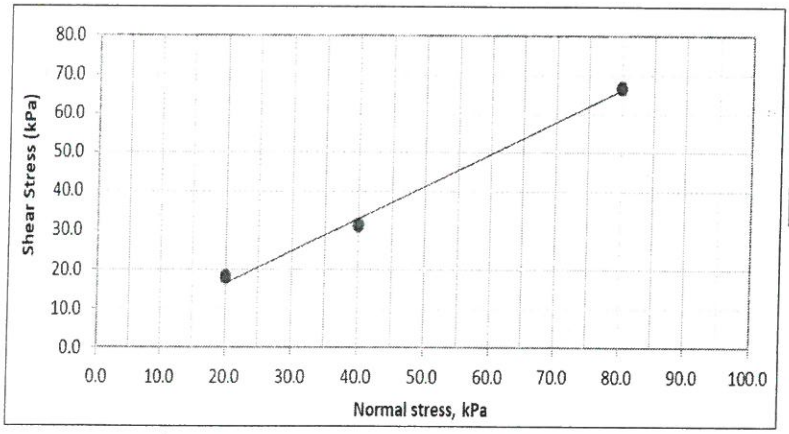
Type/Description	Light brown to off white very gravelly silty SAND, gravells are composed of siltstone pieces with fragments of gypsum	*Sample Reference*	Not Provided
		Sample, brought in by	Customer Representative
Sampling Method	Not Provided	*Sampled by*	Customer Rep./ Consultant
Prep. Method	BS 1377 Part 7, Section 4	*Sampling Date (dd/mm/yy)*	Not Provided
Test Method	BS 1377 Part 7, Section 4.5.4	*Received on (dd/mm/yy)*	27/02/23
Test Variation	None	*Tested on (dd/mm/yy)*	06-08/03/23

Laboratory Data (Proctor)

Reference	Date	MDD (Mg/m^3)	OMC(%)	Test Method
0223/233 (Issued by CMW Lab.)	15/02/23	1.89	13.9	BS 1377 Part 4

Test Specimen Details

Dry Density (Mg/m^3)	Moisture Content (%)	% of MDD (%)	Material Used	Loading Rate (mm/Min.)
1.80	13.9	95	Pass 5.0mm	0.625



Test Result	
Cohesion (kPa)	0.3
Friction angle (degree)	39.4

REMARKS:

1. Test Conducted on submerged condition.
2. Sample Description given by the customer: Embankment Material.
3. MDD=1.89Mg/m^3 & OMC=13.9% was provided by the customer (Report ref.: 0223/233 dated 15/02/23 issued by CMW Laboratory)

مختبرات بينونه ABU DHABI BAYNUNAH LABORATORIES ابوظبي

Eng. Mamoun Hammad
Resident Manager

- *This report shall not be reproduced except in full, without written approval from laboratory.*
- *The result relate only to the tested sample.*

ISO 9001 UKAS MANAGEMENT SYSTEMS 8327
ISO 14001 UKAS MANAGEMENT SYSTEMS 8327
ISO 45001 UKAS MANAGEMENT SYSTEMS 8327