



SCOPE OF WORKS FOR CONSTRUCTION OF THE SHOTBLAST BOOTH CONCRETE FOUNDATION WITHIN TRANSNET ENGINEERING, UITENHAGE DEPOT.

UITENHAGE, WORKSHOP

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1. DOCUMENT AUTHORITIES

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Department Affected	PEMM, Wagons Manufacturing
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2. EXECUTIVE OVERVIEW

Transnet Engineering is an engineering division of Transnet SOC Ltd, comprising of a group of product focused businesses in manufacture, upgrading, conversion, repair, and maintenance of railway rolling stock as well as spares and associated transport equipment.

The Shotblast Booth does not have a foundation, therefore the foundation is required before installation. The area has been identified for the foundation at the workshop.

Transnet Engineering has proposed to install the shotblast booth inside the identified workshop.

3. EMPLOYER'S OBJECTIVE

The purpose of the project is to construct the shotblast booth concrete foundation (civil works).

Once the foundation (civil works) is completed, the end user will install and commission the shotblast booth.

4. DESCRIPTION OF SERVICES

Construction of the shotblast booth concrete foundation including drainage water system.

5. TECHNICAL REQUIREMENTS

The main deliverables would be as per the scope of works, in summary, to be carried out is as follows and to be read in conjunction with part C3 of the scope of works:

Item no.	REQUIREMENTS
A	DIMENSIONAL PARAMETERS
1	The foundation is $\pm 125.658\text{m}^2$ estimated (Inside workshop) and $\pm 30\text{m}^2$ for concrete slab outside workshop
2	Shotblast foundation area (Refer to drawing) - Area 1= $(16.260\text{m} \times 6.680\text{m}) = 120.7245\text{m}^2$ - Area 2= $(2.710\text{m} \times 1.810\text{m}) = 4.9051\text{m}^2$ - Area 3= $(4.550\text{m} \times 2.000\text{m}) = 9.100\text{m}^2$ Concrete slab outside the workshop/near - Area 4= $(1.500\text{m} \times 1.200\text{m}) = 1.800\text{m}^2$ Bidders to quote for the concrete slab of 200mm/25Mpa with reinforcement that is required for the dust collector structure that will be 10tons in weight capacity for the area of - Area 5= $(10\text{m} \times 3\text{m}) = 30\text{m}^2$
B	BULK EXCAVATION AND EARTHWORKS
3	Break down and blasting the existing concrete floor for the required area including working allowance/space.
C	SITE CLEARANCE
4	Before the earth work is started the area coming under cutting and filling shall be cleared of all obstruction.
E	SETTING OUT AND MAKING PROFILES
5	Concrete pillars will be erected at suitable points in the area to serve as benchmarks for the execution of the work. These benchmarks shall be connected with G.T.S. or any other permanent benchmark approved by the Engineer-in-charge. Necessary profiles with pegs, bamboos and strings shall be made to show the correct formation levels before the work is started.
F	EXCAVATION
6	The contractor shall notify the Engineer-in-charge before starting excavation and before the ground is disturbed, to enable him to take existing level for the purpose of measurements.
7	The ground levels shall be taken at 5 to 10 metres intervals in uniformly sloping ground and at closer distance where local mounds, pits, or undulations are met with, as directed by the Engineer-in-charge.
8	The ground levels shall be recorded in field books and plotted on plans, which shall be signed by the Contractor and the Engineer-in-charge, before the earthwork is actually started.
9	The Contractor shall perform excavation in all types of soils, murrum, soft and hard rock, boulders etc. in foundation, over areas and in trenches to widths, lines, levels, grades, and curves as shown in the engineer's drawing or lesser widths, lines, levels, grades, and levels as directed by the Engineer-in-charge
G	CLASSIFICATION OF EARTH WORK
10	The earthwork shall be classified under the following main categories and measured separately for each category. All types of soil, murrum, boulders, soft rock, Hard rock

H	ALL TYPES OF SOILS, MURRUM, BOULDERS
11	This includes earth, murrum, top deposits of agricultural soil, reclaimed soil, clay, sand, or any combination thereof ad soft and hard murrum, shingle etc. which is loose enough to be removed with spadies, shovel and pickaxes. Boulders not more than 0.03 cum. in volume found during the course of excavation shall also fall under this classification.
I	EXCAVATION IN SOFT ROCK
12	This shall include all materials which are rock or hard conglomerate, all decomposed weathered rock, highly fissured rock, old masonry, boulders bigger than 0.03 cum, in volume but not bigger than 0.5 cum. and other varieties of soft rock which can be removed only with pick axes, crow bars, wedges and hammers with some difficulty. The mere fact that the contractor resorts to blasting and / or wedging and chiseling of reasons of his own, shall not mean the rock is classifiable as hard rock
J	EXCAVATION IN HARD ROCK
13	Hard rock excavation shall be excavation in material (including boulders exceeding 0.15 cubic metres in individual volume) that cannot be efficiently removed without blasting or without wedging and splitting or be in material, which cannot be excavated by a loader/backhoe or by a scraper without prior ripping
K	EXCAVATION IN HARD ROCK BY CHISELING AND WEDGING
14	Where blasting is not permitted and if the Engineer-in-charge so desires, the excavation shall be done by chiseling and wedging or any other agreed method.
15	Note: All the excavated hard rock obtained shall be stacked properly and neatly within the specified lead by the contractor as directed by the Engineer-in-charge
L	EXCAVATION
16	The excavation under all classifications in areas in trenches or in pits shall be carried out systematically. Cutting shall be done from top to bottom and not under pining or under cutting will be allowed. The bottom and sides of excavation shall be dressed to proper level, slopes, steps, camber etc. by removing high spots and ramming thoroughly as directed by the Engineering-charge.
17	All the excavation shall be carried out strictly to the dimensions given in the drawing. The width shall generally be of the width of mudmat concrete, and depth as shown in drawing or as directed by the Engineer-in-charge, according to availability of the desired bearing capacity of soil below.
18	After the excavation is completed, the contractor shall notify the Engineer-in-charge to that effect and no further work shall be taken up until the Engineer-in-charge has approved the depth and dimensions an also the nature of foundation materials, levels and measurements shall also be recorded prior to taking up any further work.
M	SHORING
19	Unless separately provided for in the schedule of quantities, the quoted rate for excavation shall include excavation of slopes to prevent falling in soil by providing and / or fixing, maintaining, and removing of shorting, bracing etc.
20	The contractor would be responsible for the design of shoring for proper retaining of sides of trenches, pits etc. with consideration to the traffic, superimposed loads etc. shoring shall be of sufficient strength to resist the pressure and ensure safety from slips and to prevent damage to work and property and injury to persons.
21	It shall be removed as directed after items for which It is required are completed should the slips occur; the slipped materials shall be removed, and slope dressed to a modified stable slope.

N	DEWATERING
22	Unless specifically provided for as a separate item in the schedule of quantities, rate shall also include bailing or pumping out all water which may accumulate in the excavation during the progress of further works such as mud mat concrete, R.C. footings, shuttering etc. either due to seepage, springs, rain, or any other cause and diverting surface flow by bunds or other means.
23	Care shall be taken to ensure that the water discharged sufficiently away from the foundations keep it free from nuisance to other works in the neighbourhood.
O	DISPOSAL OF EXCAVATED MATERIALS: ANTIQUITIES
24	Any finds of archeological interest such as relics of antiquity, coins, fossils, or other articles of value shall be delivered to the Engineer-in-charge and shall be the property of the Transnet.
P	USEFUL MATERIALS
25	Any material obtained from the excavation which in the opinion of the Engineer-in charge is useful, shall be stacked separately in regular stacks as directed by the Engineer-in charge and shall be the property of the Transnet.
26	No material excavated from foundation trenches of whatever kind they may be are to be placed even temporarily nearer than about 3m from the outer edge of excavation. Discretion of the Engineer-in-charge in such cases is final.
27	All materials excavated will remain the property of Transnet. Rate for excavation includes sorting out of the useful materials and stacking them separately as directed within the specific lead.
28	Material suitable and useful for backfilling or their use shall be stacked in convenient place but not in such a way as to obstruct free movement of materials, workers and vehicles or encroach on the area required for constructional purposes.
29	It shall be used to the extent required to completely backfill the structure to original ground level or other elevation shown on the plan or as directed by the Engineer-in-charge
30	Materials not useful in anyway shall be disposed of, levelled, and compacted as directed by the Engineer-in-charge within a specified lead.
31	The site shall be left clear of all debris and levelled on completion
Q	BACKFILLING IN SIDES OF FOUNDATIONS, UNDER FLOOR ETC
32	The backfilling shall be done after the concrete has fully set and shall be done in such a way as not to cause under-thrust on any part of the structure.
33	Where suitable excavated material is to be used for backfilling, it shall be brought from the place where it was temporarily deposited and shall be used in backfilling.
34	All timber shoring and form work left in the trenches, pits, floors etc. shall be removed after their necessity ceases and trash of any sort shall be cleared out from the excavation.
35	All the space between foundation masonry or concrete and the sides of excavation shall be backfilled to the original surface with approved materials in layers not exceeding 150mm, in thickness, watered and well consolidated by means of rammers to at least 95% of the consolidation (ASHTO)
36	Areas inaccessible to mechanical equipment such as areas adjacent to walls and columns etc. shall be tamped by hand rammer or by handheld power rammers to the required density.
37	The backfill shall be uniform in character and free from large lumps, stones, shingle or boulder not larger than 75mm. in any direction, salt, clods, organic or other foreign materials which might rot. The backfilling in plinth and under floor shall be well consolidated by means of mechanical or hand operated rammers as specified to achieve the required density.
R	CONCRETE FLOOR SLAB CONSTRUCTION PROCESS

40	1. Assemble and Erect Formwork 2. Prepare and Place Reinforcement 3. Pour, Compact and Finish Concrete 4. Curing Concrete and Remove Formwork Note: Every layer must have a compaction result before continuing with the next one.
S	ASSEMBLE AND ERECT FORMWORK FOR SLAB
41	The formwork shall be designed to withstand construction loads such as fresh concrete pressure and weight of workers and operators
T	PREPARE AND PLACE REINFORCEMENT FOR SLAB
42	Prior to the placement of reinforcement for concrete floor slab construction, inspect and check forms to confirm that the dimensions and the location of the concrete members conform to the structural plans. Added to that, the forms shall be professionally cleaned and oiled but not in such amount as to run onto bars or concrete construction joints.
43	Provides necessary reinforcement details, so it only needs understanding to use designated bar size, cutting required length, and make necessary hooks and bents. After preparation is completed, steel bars are placed into their positions with the provision of specified spacings and concrete cover.
44	The concrete cover and spacing for floor slabs can be maintained by introducing spacers and bars supporters. Wires are used to tie main reinforcement and shrinkage and temperature reinforcement (distribution reinforcement)
45	Every layer must have a compaction result before continuing with the next one.
46	Note: It should be known that incorrect reinforcing steel placement can lead to serious concrete structural failures. Improper concrete cover exposes reinforcement bars to danger and jeopardize concrete-steel bond.
U	POUR, COMPACT AND FINISHING CONCRETE FLOOR SLAB
47	Mixing, transporting, and handling of concrete shall be properly coordinated with placing and finishing works. In floor slab, begin concrete placing along the perimeter at one end of the work with each batch placed against previously dispatched concrete.
46	Concrete should be deposited at, or as close as possible to, its final position to prevent segregation.
47	Concrete placement in large and separate piles, then moving them horizontally into final position shall be prevented. Moreover, site engineer shall monitor concreting properly, and look for signs of problems. For example, loss of grout is the indication of improper sealing and movement of joints.
48	Added to that, cracking, excessive deflection, level and plumb, and any movement shall be checked and tackled to prevent further problems. Furthermore, fresh concrete should be compacted adequately to mold it within the forms and around embedded items and reinforcement and to eliminate stone pockets, honeycomb, and entrapped air. Vibration, either internal or external, is the most widely used method for consolidating concrete.
V	CURING CONCRETE AND REMOVE FORMWORK
49	After finishing ended, suitable technique shall be used to cure the concrete adequately. Slab curing methods such as water cure; concrete is flooded; ponded; or mist sprayed.
50	In addition to water retaining method in which coverings such as sand; canvas; burlap; or straw used to keep slab surface wet continuously, chemical Membranes, and waterproof paper or plastic film seal
W	FLOOR SLAB CONCRETE FOUNDATION WITH SELF LEVELLING SCREED SYSTEM COMPRISING A RESIN & ACTIVATOR BLENDED

51	The suitable membrane type and thickness of the product shall be confirmed by the Civil Engineer upon assessment/design of the foundation and requirement needed
52	Scrape off excess and loose material from footings.
53	Troxler density tests are to be performed
54	Safety requires that shotblast foundation be smooth by use of power floating and level to accommodate the operation and every part thereof shall be of suitable design and construction, of suitable and sound material and of sufficient strength
55	The bidders shall attach the catalogue / literature for the proposed self-levelling screed.
X	UNDERGROUND WATER DRAINAGE
56	The proposed location of all subsurface drains shall be clearly indicated on the Drawings, including the nominal depth and width of the trench, and the location with respect to the line of the kerb/gutter or edge of foundation. The location of outlets and cleanouts shall be indicated on the Drawings.
57	<u>The following shall be noted for groundwater apart:</u> • Installing a watertight barrier and designing the foundation walls and slab to support the full design water pressure. • Installing a groundwater relief/dewatering system to drawdown the groundwater levels (e.g., dewatering wells either interior or exterior to the building). • Installing a sub-slab drainage system. • Drainage mats (blankets)
Y	ELECTRICAL INSTALLATION
58	The submersible pumps will be used, the contractor shall submit all documentation and user manuals including drawings etc.
59	Electrical contractor shall do the electrical installation and connection to the nearest power mains, test and issue a COC in accordance with SANS10142-1.
Z	DETAILS OF RAILS
60	Removal of existing rails and set aside for re-use
61	Install holding down plate into the new reinforcement concrete floor
62	Plate size 50mm (W) and 5mm (thick) at 1m apart for a total length of 36m
63	Fastening of rails and alignment to match the outside existing line/rails
AA	COMMISSIONING
64	A performance test to the satisfaction of the stakeholders shall be conducted by the contractor.
65	The contractor shall undertake to repair all faults due to bad workmanship and/or faulty materials during a period of twelve calendar months, calculated from the date that the project is accepted by Transnet Engineering.
66	Any defects that become apparent during the guarantee period shall be rectified to the satisfaction of Transnet Engineering at the cost of the supplier.
67	Suppliers to note that a detailed construction drawing will be shared on the execution stage

6. HEALTH AND SAFETY REQUIREMENTS

- 6.1 All equipment and installation whether detailed in this specification or not shall comply with the requirements of the Occupational Health and Safety Act 85 of 1993 as amended and all other applicable legislation including specific set of regulations and local authority bylaws where applicable.
- 6.2 The contractor shall hold monthly safety meetings with staff and records of minutes. shall be kept on file on site.
- 6.3 The contractor shall be available for monthly meetings with Transnet Management. A schedule for these meetings may be agreed upon.

7. SHE SPECIFICATION

- Prior to commencement of contract, the contractor shall be issued with a SHE specification to compile a SHE files in line with TE requirements.
- Prior to establishing on site, it is an explicit requirement of this contract that all the Contractor's personnel directly involved with this contract, including those of sub-contractors, attend a Safety induction course. Transnet will provide the course free of charge and attendance is compulsory for all personnel under the control of the Contractor who, during the duration of the contract, will be present on site whether on a full time or adhoc basis.
- The contractor must allow for all additional charges because of these requirements as no claims for extras will be accepted in connection with the foregoing.

8. AS PART OF THE LEGISLATIVE AND TE SHE REQUIREMENTS.

- The successful contractor is required to conduct a Risk assessment to ascertain all potential risks associated with this project. The completed risk assessment is to potential risks associated with this project. The completed risk assessment is to be formally submitted to the Risk department via the project manager at least two weeks prior to the commencement of the actual project.
- A safety file and associated documents will be required from a successful tenderer, and such will be communicated by the Risk department.