DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

MINISTRY OF HEALTH AND MASS MEDIA

RENOVATION OF MEDICAL GAS PLANT ROOM TEACHING HOSPITAL – PERADENIYA

CONTRACT NO: THP/AD/13/2026

ADDENDUM–01

Director,
Teaching Hospital,
Peradeniya

06th November 2026

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RENOVATION OF MEDICAL GAS PLANT ROOM
TEACHING HOSPITAL – PERADENIYA

CONTRACT NO: THP/AD/13/2026

ADDENDUM-01

Dear Sir/Madam,

Following addendum is issued in accordance with "Instructions to Bidders" Clause 10 of Bidding Document already issued to you.
Please acknowledge receipt of this addendum by returning attached letter duly signed and attached along with your Bid.

No.	Reference in Bidding Document	Amendment
1.1	Page no-17 to Page no- 25 in Volume 02 SPECIFICATIONS	Description shall be replaced in Mechanical works as follows, <u>To be deleted</u> All the pages from 17 to 25 shall be deleted. <u>To be replaced:</u> page number from 2 to 11 of the below attachment shall be replaced.

SPECIFICATIONS FOR MEDICAL GAS SYSTEM

GENERAL TECHNICAL SPECIFICATION

1.0 GENERAL

1.1 INTRODUCTION

This section consists of the general rules that apply to the design, manufacture, shop testing, delivery to site, erecting, commissioning, site testing, maintaining and handing over the material, equipment plant and services required for **Renovation of Medical Gas Plant Room – Teaching Hospital, Peradeniya.**

- The contractor for Piped Medical Gas system shall be a reputed local company having experience in planning, engineering, supplying, installing, testing, commissioning and maintenance of similar type of piped medical gas system at least for last five (05) years.

- The manufacturer of the Piped Medical Gas equipment shall have at least ten (10) years' experience in the design and manufacture of similar type equipment's.

- The make of Piped Medical Gas system offered shall have satisfactory service record in Sri Lanka at least for last five (5) years.

The Bidder shall attach documentary evidence of the above and completed technical schedule for consideration. Failure to complete the technical schedule and attachment may be considered as incomplete offer during evaluation.

1.2 Applicable Standards

The products and work shall comply with the Health Technical Memorandum 02-01 and British Standards for Medical Gas System.

1.3 Guarantees

(a) All equipment, materials and workmanship shall be guaranteed for a period of one year, beginning with the date of acceptance of the works in writing.

(b) The contractor's warranty shall include at least 4 preventive maintenance inspections of the system to repair and replace any items found to be defective during this one year period.

1.4 Required Submittals along with the Offer

(a) Data on products offered for the installation.

(b) Lists of recommended spares & consumable for one year period.

1.5 Engineer's Drawings

(a) The Engineer's Drawings, plans are intended to be diagrammatic. They are not intended to show every item in its exact location, the exact dimensions or all the details of the equipment proposed to ensure that the equipment would fit in the available space.

(b) Installations shall be within the limitations imposed by the architectural, structural, electrical and plumbing requirements with adequate space for maintenance.

2.0 PRODUCTS

2.1 General

(a) All products shall be first-line quality of grade and type shown on the drawings and specifications or equivalents accepted by the Engineer in writing.

(b) All products shall be in current production with no notice having been given that this product is to be drastically changed, modified or discontinued from production.

(c) The Contractor, by submitting, certifies that equipment being proposed is proper for the application intended and that it has the capacity called for.

2.2 Complete System

All products, materials and accessories shall be furnished and installed as required for a complete system ready for Employers beneficial use.

3.0 EXECUTION

3.1 Workmanship

(a) All work shall be performed by competent mechanics using proper tools and equipment to produce first-quality work. All work shall be neatly installed, accessible for maintenance and complete with all accessories required.

4.0 TECHNICAL LITERATURE

On completion of work the successful bidder is required to provide all technical literature of machinery/ systems, including service/ maintenance/ operational manuals in English

PARTICULAR SPECIFICATION

1.0 SCOPE OF WORK

1.1 General

This contract is for the **Renovation of Medical Gas Plant Room – Teaching Hospital, Peradeniya**

1.2 Location of Site

The site is located in Teaching Hospital, Peradeniya.

1.3 Scope of Contract

Supply and installation of the following equipment accordance with the requirement of HTM 02 - 01 & British Standards for Medical Gas System.

(i) Dismantle and remove the existing medical air compressor and vacuum plants, including all associated equipment and accessories, and hand over to the Hospital along with a complete inventory list.
(ii) Supply and installation of A Triplex Medical Air Compressor plant of capacity 2500 l/min FAD, at a pressure of 10 Bar System should consist of 3 Nos. Compressors (2-duty and 1-standby) complete with dryers, filters, accessories, etc. The capacity of the receiver tank should be 1800 l and it should be facilitated with all precautions for high pressure vessel applications.
(iii) Supply and installation of A Triplex Medical vacuum plant of capacity 2500 l/min. when pump operate at a vacuum of 475mmHg and 450mmHg at the plant pipeline connection. The minimum capacity of the receiver tank shall be 3000 l.
(iv) Supply and installation of Central Alarm Panel
(v) Modification of Existing Power Supply

1.4 Tests on Completion

All equipment shall be carefully inspected and tested at the site after erection to show that they operate satisfactorily and meet the requirements of HTM 02-01. These tests shall be carried out in the presence of the Engineer and shall be to his satisfaction.

2.0 TECHNICAL SPECIFICATION

2.1 Medical Compressed Air System

Compressed air for medical use shall be produced at a central compressed air plant located in the medical gas room. The system shall be in compliance with the current HTM 02-01 and C11 standards.

The central compressed air system shall consist of **three numbers** Screw type medical air compressors of capacity minimum 2500 l/min each. Compressors shall be oil-lubricated, provided that suitable arrangements are made to ensure that the air quality specification as per HTM 02-01.

The three compressor units shall be connected to a single tank or shall be of the receiver mounted type complete with filter assembly, silencer, safety valves, after coolers, isolation valves and non-return valves. Air shall be drawn into the compressor via filters and compressed to a pressure of 10 bars before being stored in the receiver tank. On demand compressed air will flow from the storage tank through an after cooler dryer, fine, bacterial filters and air regulator to reduce to a constant 7 bar pressure. The air supplied to the distribution pipe shall be completely clean, dry and bacterial free.

The operation of the compressors shall be automatic and shall be arranged for alternate operation and parallel operation depending on the demand. The pressure settings shall be as stipulated in HTM 02-01.

2.1.1 Air Compressors

The air compressors shall be of the electrical motor driven type 3 phase 400V, 50Hz. It shall be suitable for continuous running on-load and start/stop operation. It shall be capable of producing compressed air at 10 bars before being cooled and stored. The compressor motors shall be of the totally enclosed fan cool type constructed to BS 2613 and 2960 with Class F insulation.

2.1.2 After Cooling

After coolers shall be of air blast type with direct drive motors. Each after cooler shall be fitted with an automatic drain and manual by-pass valve.

2.1.3 Receiver

The air receiver shall be constructed to BS 5169 or similar with test certificates provided to the user. It shall be complete with relief valve, fusible plug conforming to BS 6759, pressure gauge and automatic drain with manual by-pass valve.

2.1.4 Filter/Dryer Assembly

Shall comprise two independent sub-assemblies either of which may be selected as duty whilst retaining the second assembly as "stand-by". This shall be provided upstream of the air dryer and shall be capable of handling air which is super-saturated with water at the compressor operating pressure. The separator shall be fitted with a moisture (and oil as appropriate) trap having an automatic drain, with manual by-pass to remove the fluids. The separator, trap and filter assembly shall remove the oil and water droplets and all oil mists. The filter shall have an efficiency of not less than 95%, when tested with test dust no. 2 in accordance with BS 2831.

2.1.5 Air Dryer

Air dryers shall be provided to obtain a dew point of minus 17°C at the line pressure of 7.2 bar (or a dew point of minus 40°C at atmospheric pressure) on the effluent air.

These shall be of either silica gel or activated alumina. They shall be contained in two column constructed to BS 5169 for Class III or BS 1500 Class III with one column in operation while the other is being regenerated. The controls shall ensure automatic depressurization of the re-activated column to prevent shock on change-over.

The dryer columns shall be preferably designed so that they can be filled and drained of desiccant without disturbing the connecting pipe work. The purge air drain shall be fitted with a silencer and run into a tun-dish connecting onto a gully. A similar arrangement should be provided to collect the fluids discharged from the trap on the upstream filter assembly. The arrangement shall be such that each dryer and filter assembly can be isolated for maintenance purposes without in any way restricting the full supply of air to the distribution system.

2.1.6 Dryer Final Filter Assembly

A filter shall be installed downstream of the air dryer. This filter when tested by the sodium flame test in accordance with BS 3928 should have a penetration not exceeding 0.5% over the range of flow up to the full capacity of the dryer.
A coarse pre-filter shall be installed if necessary.
Each dryer and filter assembly shall be rated for continuous use of the full free air delivery (F.A.D.) capacity of the compressor with the air at 100% relative humidity, at the pressure and temperature at which it is designed to leave the after cooler. Each dryer shall be designed to provide desiccant bed life not less than two years on continuous full load so that the normal installation, which consists of two complete and independent dryer/filter assemblies would be capable of providing four years of continuous full load service if the two systems are used on a "duty" and "standby" basis.

Each of the two sets shall be fitted with a safety valve conforming to BS 1123 and a 100mm diameter pressure gauge conforming to BS 1780. The gauge shall be marked with a signal blue band in the working range.

2.1.7 Bacterial Filters

Duplex bacterial filters shall be fitted upstream of the final pressure regulator with appropriate isolation valves. The filters should provide particle removal to 0.01 mg per m^3 and DOP penetration of less than 0.0001%.

2.1.8 Compressor Control System

The control assembly for each compressor shall be in three compartments. Each outer compartment shall contain the controls for one compressor and its associated equipment. The center compartment shall contain an incoming MCCB, the duty selector switch to cater to both units, and the limited amount of wiring and accessories common to both sets. Steel bulkheads shall be provided to minimize the risk of the spread of fire from one compartment to the next. Warning notices indicating the presence of medium voltage shall be attached to each compartment as necessary to conform with the Institution of Electrical Engineers (I.E.E.) Regulations for the Electrical Installations and standard alarm facilities as recommended.
Each compressor plant shall be supplied from a separate sub-circuit to a load breaking isolating switch and interlocked with its cover. Auxiliary apparatus and associated circuits shall be protected by H.R.C. fuses mounted within the enclosure.

Each motor shall have its own starter which should be rated for "frequent duty" in accordance with BS 587 and fitted with thermal overload protection. The starters shall be of automatic type so that, the compressors shall be arranged for alternate duty and standby operation automatically. The standby compressor shall also operate automatically during periods of peak demand or in the event of a duty compressor failure. A running hour recorder shall be provided for the compressors and pumps. All three phase motors shall have single-phasing preventors. Motor starters shall be direct-on-line or star delta as appropriate. The starter should allow automatic re-start after an interruption to the power supply.

An industrial grade ammeter to BS 89 shall be connected in the yellow phase connection to each main motor. The full load indication of the ammeter shall be not less than 80% of its full scale deflection.

A hand/auto switch shall be provided for each compressor assembly so that each set may be run continuously under hand control. A lamp, on the appropriate panel and suitably labeled, shall indicate when the compressor is operating under these conditions. When any compressor is operated under hand control the alarm system shall indicate this.

The pressure switch settings shall be adjustable so that the operating range can be fixed over a reasonable band, and any compressor can be made the duty one by means of the duty selector switch.

Control coils shall be designed for phase/neutral connection.

All indicating lamps shall be under-run so as to ensure a lamp life of at least one year.

All wiring shall be numbered.

An indestructible wiring diagram shall be fixed inside the panel.

2.2 Medical Vacuum System

The Triplex medical vacuum system shall be designed to maintain a vacuum of not less than 400 mm Hg below a standards atmospheric pressure of 760mm Hg (ie. An absolute pressure of approximately 360 mm Hg) in the pipe line at remote terminal unit. The vacuum plant shall have a capacity of 2500 l/min of free air.

Bacterial filters shall be provided in parallel between the drainage traps and the reservoir. The arrangement and capacity of the filters shall be such that one filter may be serviced without interrupting or restricting the vacuum service as a whole. The filters shall have a penetration not exceeding 0.05% when tested by the sodium flame test in accordance with BS 3928. Proper arrangement shall be made for safety when changing the filters.

A drainage trap shall be installed between the filters and the pipe line. The bowl of the trap should be sterilizable. The trap bowl should be transparent or be fitted with a transparent window. The trap and filter may be combined.

The exhaust gases shall be discharged outdoors, above roof level of the plant room house away from windows and other air intakes. The filters shall prevent the risk of contamination arising from the discharge from the pump. A “hazard” warning should be displayed in a prominent manner near the discharge point.

The vacuum system shall be operated by three identical air cooled, oil lubricated rotary sliding vane pumps complete with contracts, valves, bacterial filters, safety devices, silencers etc., mounted on a horizontal receiver vessel in a package configuration and each vacuum pump shall be driven by a 3/50/400V TEFC electric motor with Class F insulation as a minimum.

Vacuum pump inlet filters shall be fitted to prevent foreign bodies from entering the pump and the exhaust shall incorporate oil separators to minimum oil loss.

Pipe work shall incorporate non-return valves to protect both the vacuum system and receiver vessel from pressurization due to inadvertent pump reversal.

The receiver vessel shall be constructed and tested to BS 5169, Class 111 and incorporate an inspection access panel and manual drain. Isolating valves shall be provided so that the plant may be used while work on the reservoir is in progress. The capacity of the reservoir shall be determined in accordance with the recommendations of HTM 02-01 and shall be such as to ensure that the number of stop/start cycles does not exceed 30 per hour.

The control panel and electrical installation shall conform to current IEE Regulations and Standard alarm facilities as recommended. The standby pump shall operate automatically during periods of peak demand or in the event of a duty pump failure. The pumps shall be provided with a timer controlled automatic change-over system to ensure both pumps are kept in regular use. The range of the timer shall be adjustable between 0-30 minutes. A running hour recorder shall be provided for each pump.

The vacuum pump package shall be designed to enable isolation of any one component for maintenance purposes without interrupting the system operation.

Motors above 5 kW rating shall be provided with star delta starters.

The vacuum pumps shall be mounted on anti-vibration mounts properly selected by the equipment supplier to minimize transfer of noise and vibration to the structure of the building.

A vacuum gauge at least 100 mm diameter, complying with BS 1780 shall be fitted of the receiver or control gear. It shall be calibrated 0-760 mm Hg (or 0-1000 mb) and indicate 0 at atmospheric pressure. The gauge shall be marked with a signal blue band in the working range.

The plant shall be supplied with one year's supply of oil and spare control system fuses.

2.5 Fixed Pipe Lines

a) Copper Pipes

Pipes used for internal installations and any installations carried in protective pipes, shall be of copper to BS 2871 Part 1 Table X or equivalent to above standard. Pipe fittings and valves for Oxygen, Vacuum, and Medical air should be Medical Grade Phosphorous De-Oxidized, Degreased, and Non-Arsenical Copper Pipes Compiled to BS EN 13348. Pipes of diameter up to and including 54 mm internal diameter shall be steam cleaned internally, dried, shot blasted and blown through with medical quality air and individually capped at both ends after passing a visual internal inspection. Bundle pipes should be sealed with an adhesive tape marked "medical gas pipes".
The selection of pipe diameter shall meet the requirement of the relevant BS standard. The pipes shall be designed for a pressure drop of 5% for Oxygen and medical air from the manifold to the remote terminal unit.

The minimum outside diameter of the pipe used shall be not less than 15 mm.

b) Joints

Joints shall normally be made on site by silver copper phosphate brazing using British Standard 1845 type AG 14 alloy. Brass brazing should not be employed. Where screwed joints are permitted they may be made with unsintered. (de - greased) P.T.F.E. tape.
All brazed joints shall be completed by flux less brazing technique in inert CO_2 or N_2 atmosphere.

2.6 Fittings and Valves

(a) General

Fittings and valves shall be supplied already cleaned and degreased and in sealed plastic bags identifying them as medical gas fittings. Fittings should be of the "high duty" type suitable for steam services gauge pressures up to 17 bars.

(b) Area valve service unit and Line Isolation Valve

Area valve service unit and lockable line valve of acceptable quality and reputed make shall be installed as indicated in the drawings.

(c) Valves

Valves of the lever operated ball type shall be provided, with a clear indication of the 'ON' and 'OFF' position. Valves on the distribution system shall be of the non-lubricated type and constructed of non-ferrous materials. They shall preferably be designed for capillary joint connections to the pipelines by silver brazing. Where screwed connections are provided for pipe line connections they should have threads in accordance with BS 3648 or pipe threads to BS 21 but this does not exclude valves having integral union joints with other threads. Non-ferrous material should be used for plant room valves for those components, which may come into contact with the gases.

(d) Valve Accessibility

Valves shall be readily accessible in an emergency from the area served by the sections of pipe work and they should be mounted at a height of 1.22 m from floor level in positions, which are unlikely to be obstructed by other equipment or apparatus. They should be clearly marked to indicate their functions in simple language describing the areas affected by the operation of each valve.

Each valve outside the plant area shall be mounted in a standard box irrespective of their function. Any valve larger than those for 28 mm O.D. pipe which are not required to be operated in an emergency may be accommodated in readily accessible parts of the duct, or in ventilated cupboards, provided the valves are lockable in the open and closed positions. Every valve shall be fitted with an identity number plate for operations purposes.

(e) Valves Boxes

Each box should be lockable and each emergency valve box shall be fitted with a suitable breakable cover. The box shall be provided with vents at the top and bottom and be large enough to allow adequate access for maintenance and for the fitting of the identification label. The keys for the boxes shall be non-interchangeable. If this involves an impossible range of keys, then at least the non-interchangeability feature may be limited either to valve boxes within one building or to those in adjacent departments within the building. The cover must be non-interchangeable with other covers, if it is marked with the name of a gas.

2.3 Electricity Supply to Medical Gas Installation

All electrical works required in connection with the medical gases system shall be carried out under this section of the works and shall be allowed for in the quoted rates. The wiring shall be in PVC insulated copper cable enclosed in rigid PVC conduit. The conduit shall be concealed in ceiling voids & ducts where available and in the building fabric except in the plant rooms where they shall be exposed. In other areas (operating theatre etc.) all surface wiring shall be carried out in surface PVC casing.

All electrical works shall be carried out in accordance with the IEE Wiring Regulations.
All electrical drawings shall be approved by the Engineer.

2.11 Earthing

Pipe lines should be bonded to the consumer's earth terminal as required by Regulation D10 of the IEE Regulations. This bonding should be made as near as possible to the point at which the pipe line enters building from the plant. The size of the bonding conductor should be in accordance with Table D.2M of the Regulations. The pipe lines should not themselves be used for earthing the electrical equipment.

Flexible connections in the fixed pipelines should not normally be used but if they are specially approved, they should be similarly bonded.

2.12 Spares and Tools

The Contractor shall also supply a set of recommended spares required for the trouble free operation of the system for a period of 2 years from completion of the maintenance period of one year. Five sets of required tools shall also be supplied at the time of handing over of the system.

3.0 TESTING AND COMMISSIONING

The formal commissioning procedure should be completed in accordance with the Hospital Technical Memorandum No. 17 - Commissioning of Engineering Services.

Tests and checks shall be carried out in the presence of the Engineer at times to be agreed with the Engineer.

4.0 MAINTENANCE MANUALS AND TRAINING

The Contractor shall be required to provide complete as-fitted drawings, circuit diagrams valve charts and maintenance instructions. Further, necessary training shall be provided to related hospital staff. Complete maintenance manuals shall be supplied and handed over at the time of satisfactory testing and taking over of the installation.

..... 2026

Director,
Teaching Hospital,
Peradeniya.

Dear Sir/Madam,

RENOVATION OF MEDICAL GAS PLANT ROOM
TEACHING HOSPITAL – PERADENIYA

CONTRACT NO: THP/AD/13/2026

We hereby certify that…….pages of Addenda No. 01 have been received by us and considered for pricing as a part of the Bid Document in accordance to the "Instructions to Bidders" Clause 10 in Bid Document.

Yours Truly,

Signature of the Bidder: ……

Company Seal …….

Date ……

"Please enclose this letter with the "ORIGINAL" of Bid submission.