

Request for Proposal (RFP)

2nd December 2042

Balderol Contract (pronunciation: boulder-ol)

INTRODUCTION

The Foundation Society is inviting the recipient contractor to present a proposal for *Balderol*, the Foundation Society's second permanent settlement on Earth's moon. Balderol will be a small repair facility with a population of less than 200 staff. Balderol will perform maintenance services on the Foundation Society's fleet of autonomous mining units, commonly called "Harvesters". The Harvesters collect surface rock and regolith to a depth of 0.5 m on the far side of the moon's southern hemisphere.

The Foundation Society expects contractors to present well-rounded and cohesive designs to fulfil the core concepts of the settlement and the detailed technical specifications, to be submitted in the format specified.

This document is issued in accordance with the Foundation Society's updated guidance on contract tendering and all information contained herein is offered in confidence and good faith. Unauthorised disclosure of any information contained in this document may represent a breach of organisational trust.

1. CONCEPT

1. **Balderol is planned as the Foundation Society's second settlement on Earth's moon.** The precise location of Balderol is at the contractor's discretion. Balderol must provide safe habitation and working conditions to its population of less than 200 staff. The allocation of staff responsibilities and exact population will be at the discretion of the contractor for optimal operation of Balderol.
2. **Balderol will perform servicing procedures such as inspection, repair, routine maintenance, and technical upgrades to Harvesters.** There are currently 56 Harvesters in place, with plans to increase the number to 150 by 2050. However, Harvesters are failing more frequently than expected, which must be fixed with servicing procedures. It is expected that Balderol will perform a total of 75 servicing procedures per year.
3. **Harvesters may come in different configurations but have a bounding box no greater than 12 m wide, 15 m long, and 6 m tall.** They are constructed from a low-alloy steel chassis, aluminium alloy cladding, and diverse internal machinery made from many ceramic components. Harvesters are powered by small nuclear reactors, which may require fuel-assembly replacements. Balderol will manage a stock of replacement parts for irreparably damaged components.

4. **Staff safety, comfort, and satisfaction are priorities for retaining talent, but a high degree of luxury is not appropriate for Balderol.** Staff will be exposed to the hazardous lunar environment, intense working conditions and relatively long solar days and nights. Proposals that make use of adequate environmental, social and technological solutions to address these challenges will be favoured.
5. **The Foundation Society demands that the proposal for Balderol be cost-effective.** This applies to both the initial costs and ongoing operating expenses. Proposals with low technical-risk, necessary expenditures and rapid deployment times will be favoured.

2. DESIGN REQUIREMENTS

Proposals for Balderol must effectively communicate the design's fulfilment of the requirements listed below. Content for the proposal may be in the form of annotated visualisations and diagrams alongside bullet-pointed text. Visualisations and diagrams may include, but are not limited to, drawings, images, graphs, flow charts and CAD models. Tables should only be used for costings and materials. Where visualisations and diagrams are used for the first time, key dimensions must be shown. Dimensions which aid in understanding should be retained across all modified forms of visualisations and diagrams. All designs are expected to be safe, reliable, and make use of an appropriate level of automation.

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| M1 | Communication systems in normal and emergency cases for safe and reliable contact with ground stations and settlements of the contractor's choice. |
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| M2 | Security systems and procedures in place to ensure only authorised personnel enter hazardous areas in both vacuum and pressurised environments. |
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| M3 | Provisions for the manufacture of custom structural components and operational equipment for Balderol. |
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| M4 | Facilities to perform repairs, maintenance, and upgrades on two Harvesters in both vacuum and pressurised environments, with specific provisions for their nuclear systems. |
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| M5 | Ancillary facilities, capabilities, and management systems to enable the repair, maintenance, and upgrade work to be undertaken efficiently. |
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| H1 | The locations, designs and critical dimensions of human-occupied working spaces within Balderol. Design choices which aid in optimal daily operations must be shown where appropriate. |
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| H2 | The locations, designs and critical dimensions of functional and aesthetic public spaces. People and machines must be able to quickly move through these spaces when transporting injured workers. |
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- H3** The locations, designs, number and size of private spaces and how they connect to public areas. Indicate facilities for individuals' choice, convenience, and comfort without impacting on personal or settlement safety.
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- H4** The total number and role-breakdown of staff and how work and safety controls will be structured to make the best use of the proposed design of Balderol while minimising the likelihood of accidents.
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- H5** Procedures and technological aids for working on Harvesters in vacuum, considering specific, hazardous activities that may need to be undertaken by staff.
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- O1** Atmospheric monitoring and regulation at a minimum of 0.7 bar within the majority of Balderol. Local control of temperature, purity, and pressure of the atmosphere must be provided in spaces where the contractor deems it is necessary.
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- O2** Liquid and solid waste processing systems and plumbing for clean and dirty streams of water through Balderol. Preserve hygiene in the event of minor failures, and ensure repairs can be made easily.
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- O3** Production, procurement and storage of adequate, nutritious, and diverse food sources.
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- O4** The generation, storage (if necessary), and distribution of useful power for Balderol with provision for load-following in response to varying demand.
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- O5** Provisions for the movement of equipment from lunar surface conditions into pressurised volumes. Mechanisms and systems to reduce the infiltration of lunar regolith into Balderol must be provided where appropriate.
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- S1** The overall design, layout, size, and main features of Balderol's structure.
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- S2** The functions of volumes within Balderol including the location of operational and mission systems where appropriate.
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- S3** The design and materials of structural elements which are exposed to lunar conditions and used inside Balderol.
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- S4** The major steps in the construction of Balderol with details of when initial-operating-capacity is reached.
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- S5** The location and design of facilities for the safe storage, disposal and, if necessary, processing of replaced components from Harvesters.
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B1	A breakdown of the expected cost of Balderol at significant construction and operation phases, with details of costs for transportation of all goods.
B2	A schedule describing contractor tasks from contract award until the completion of Balderol.
B3	A plan of work indicating core operational activities to cover from the achievement of initial-operating-capacity until five years later.
B4	Site selection for the precise location of Balderol with details of the selection criteria used by the contractor.
B5	Key features of the proposal that minimise the total construction and operational cost of Balderol.

3. PROPOSAL REQUIREMENTS

The Foundation Society will consider only proposals submitted punctually fulfilling the following the criteria:

1. Proposals must contain no more than 20 slides (not including a title slide).
2. To provide high-level context, an exterior view of the settlement must feature on the title slide and an annotated layout diagram within the first three content slides.
3. Presentations may be no longer than 15 minutes and will be followed by five minutes of questions.
4. Proposals must be submitted as a PDF at the specified time and be presented from this version.
5. No more than six presenters may speak during the presentation and those individuals may not answer follow-up questions.
6. SI units must be used throughout the proposal, but may be presented alongside any other appropriate units or comparisons.
7. All slides must feature a clear slide number, not covered at any time.
8. Content must be wholly original or transformative, presenting no material previously shown to the Foundation Society.
9. Content must be thoroughly and accurately referenced against academic literature and the Foundation Society AI-usage guidelines where applicable.