

HYDRO TURBINE ENGINEERING DIVISION
Purchase Specification for Metallic Acoustic (Sound Proof) Door

1. DESCRIPTION:

(i) Manual Metallic Acoustic (Sound Proof) Door for Turbine Pit Entrance (Item-1):

Manual Metal Acoustic (Sound Proof) Door shall be installed at the entrance of a concrete turbine pit entrance which is 1830 mm (Height) x 1500 mm (Width). The door shall have suitable handle and inside panic release bars. The door shall be equipped with suitable interlock / indication / alarm and shall be interfaced with the plant SCADA system / security and surveillance system. The size of pit entrance given may vary within allowed civil tolerance.

Sketch-1 showing the dimensions of Turbine Pit Entrance is attached.

(ii) Motorised Metallic Acoustic (Sound Proof) Door for Runner Removal Gallery (Item-2):

The Motorised Metal Acoustic (Sound Proof) Door shall be installed at the entrance of a concrete passage of runner removal gallery (through which the Francis Runner shall be removed) which is 2000 mm (Height) x 4300 mm (Width). The runner removal gallery floor / inlet door floor shall be acoustically isolated from Runner Removal gallery by providing acoustic shutter.

The shutter shall be of vertical leaf type having suitable number of leaves to close the openings. Door frames / guide and sill beams shall be flushed with concrete. The Door shall be open through electric motor and shall be lifted to a vault above the gallery provide for the same. Ball / Roller bearings shall be provided for smooth passage through the guides.

The leaves shall be made of light weight acoustic material (metal) and shall be corrosion, water and vermin proof. The lowest leaf shall have hinge door of suitable size with handle & lock etc. for routine inspection and arrangement shall have noise leakage resistant an aesthetic look.

Automatic stopping arrangement shall be provided at full open and full close positions. The shutter and the door shall be equipped with suitable interlocks / indication/alarm and shall be interfaced with the plant SCADA system / security and surveillance system.

Suitable ground clearance is to be provided, because rails have been laid 10 mm above the floor for the rail carriage for Francis runner removal through the runner removal passage. Accordingly, sound proofing from the bottom is to be decided by vendor.

The size of runner removal gallery may vary within allowed civil tolerance.

Electric motor: The requirements of the electric motor are as follows:-

- (a) Motor construction shall be normally to IS-325/IS12615.
- (b) Each door shall be provided with an electric motor of adequate capacity for the duty capacity. Motor insulation needs to be class F with temperature rise upto class B.
- (c) Motor shall be designed and manufactured strictly in line with applicable latest edition of Indian Standard (IS). It shall be designed for 415 volts ($\pm 10\%$), 3-phase, 50 Hz ($+5\%$

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& -5 %) AC supply. Combined variation in voltage & frequency should be within $\pm 10\%$ absolute sum. Motor shall be able to sustain transient overvoltage of 130% of nominal voltage.

- (d) Motor shall be TEFC, squirrel cage Induction type. The motor insulation (Class F but temperature rise shall be limited to class B insulation at continuous running at 10% overload) shall be resistant to moisture, oil or oil vapor and the motors in general shall be so designed as to suit the tropical climate. Varnished cambric or glass insulation class F shall be used for connection from the windings to the terminals but temperature rise shall be limited to Class B insulation at continuous running at full rated load. Degree of protection shall be IP-54 or better. Motor shall be suitable for operation in damp location.
- (e) Starting of motors i.e. DOL up to 50 kW and above 50 kW it shall be Star Delta.
- (f) Motor shall be interfaced with the plant SCADA system / security and surveillance system.
- (g) Each motor shall be provided with lifting hooks /eye bolts for handling purpose.
- (h) In order to prevent undue & harmful vibration, the motor shall be statically and dynamically balanced, vibration displacement or velocity shall be measured in accordance with DIN 45665. The results for all motor shall be within the "R" (reduced) limits.
- (i) Motor shall be of standard frames manufactured by any one of the following reputed makes:

M/S Kirloskar Electric Co. Ltd.,
M/S Asea Brown Boveri,
M/S Crompton greaves,
M/S Siemens,
M/S Jyoti,
M/S GE,
M/S Bharat Bijlee,
M/S NGEF/GEC Kolkata /Areva,
Any other reputed make subjected to approval of BHEL

Sketch-2 showing the dimensions of Runner Removal Gallery is attached.

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2. SCOPE OF SUPPLY:

- (i) Design, manufacturing and supply (Transportation).
- (ii) All accessories, Instrumentation, hardware and installation materials will be in scope of vendor.
- (iii) Any special tools or devices required to dismantle the door must be supplied along with door.

3. OTHER DESIGN REQUIREMENTS:

- (i) The noise level measured at a distance **0.5 meter** from the acoustic door shall not exceed **70 dB**. The thickness of the door is to be not less than 100 mm.
- (ii) The STC (Sound Transmission Coefficient) value of door shall be more than 35 STC.
- (iii) Vendor to submit the QA plan for approval. Vendor to also submit drawing giving complete Bill of material, weight and dimensions for approval. Manufacturing to be started only after the drawing and QA plan is approved. Inspection shall be carried out by our customer UJVNL or BHEL.
- (iv) Complete details of sealing around the periphery of the door and at butting of door is to be furnished in the offer.
- (v) Complete details of any embedments required in the wall / concrete for acoustic doors and putting sealing material around the periphery of the door must be clearly mentioned in the drawing.
- (vi) Suitable arrangement (winch etc) shall be provided for opening/closing of doors.
- (vii) Vendor to mention erection charges, if any, separately.
- (viii) Erection shall be carried out by vendor.
- (ix) The doors should be removable and any special tools or devices required to dismantle the door must be supplied along with door.
- (x) Acoustic material used must conform to IS or any other material specification.
- (xi) Acoustic material used must be fire resistant.

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- (xii) In case of motorized acoustic door, locking system shall be provided so that at the time of power failure the door will as it in same position.
- (xiii) Acoustic Door should be provided with suitable locking arrangement from outside the door in closed condition.
- (xiv) Lifting lugs are to be provided on each door.

4. MATERIAL OF CONSTRUCTION: Acoustic material (metal) .

5. DOCUMENTS TO BE FURNISHED:

Along with offer:

- (a) OGA drawing of acoustic door showing overall dimensions, bill of material, constructional features, installation details and material specification of various components etc.
- (b) Catalogue describing details, material of components and dimension of the door.
- (c) Filled in check list (Technical Parametrs)
- (d) List of deviations from purchase specification, if any

Vendor to note that if above documents are not furnished along with the offer; the offer shall be rejected

After placement of order:

- (a) QA plan for approval by BHEL or BHEL's customer.
- (b) Installation drawing of acoustic door with overall dimensions and complete Bill of Material with material of construction and weight for approval. Wiring diagram / P & I diagram of electrical motor (*wherever applicable*).

Manufacturing of doors shall commence only after approval of drawing and QA plan.

At the time of supply:

- (a) 3 copies of test certificates / test reports / inspection records and performance test certificates / guarantee certificates to BHEL items. 1 copy of the above documents shall be put inside the case/ package.
- (b) Shipping / packing lists of the door.

(8)

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- (c) O &M Manual and other important documents

Note: The shipping list should contain the following information for each case / package.

Case number, dimensions of case, gross weight of case, list of items contained in the case giving Drawing/catalogue no., items no. of BOM, weight, description of item and quantity.

6. PAINT & PROTECTION:

Acoustic door shall be thoroughly cleaned and painted. Doors to be painted with zinc rich primer (tk 40 microns) followed by epoxide finishing paint (tk 300 microns). Details of painting to be given in the drawing.

7. INSPECTION & TESTING:

Following tests shall be conducted and test certificates shall be furnished accordingly.

- i) General inspection and testing as per relevant standards.
- ii) Chemical composition and mechanical test for material of major components and hardware.
- iii) Sound Proof / acoustic test as per specification and requirements.
- iv) Dimensional and visual Inspection

8. DEVIATIONS:

If the vendor is unable to fulfill all the requirements mentioned in our purchase specification; a list of deviations is to be prepared by the vendor and the same is to be submitted to us along with the offer. Otherwise it shall be understood that the vendor is meeting all the requirements specified by us.

9. GUARANTEE:

The door must be guaranteed for trouble free operation, good workmanship for a period of 18 months from date of commissioning of door or 24 months from the date of dispatch whichever is later. Vendor shall undertake to replace any material / components free of cost if found defective in operation during guarantee period.

10. PACKAGING:

The door shall be suitably packed & covered. The packing shall be suitable for long storage and to avoid damage / pilferage during transit.

Each door shall be identified by stamping & filling the red enamel paint.

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ANNEXURE-I
TECHNICAL PARAMETERS OF DOOR
(To be filled in by the vendor and submitted along with the offer)

- | | |
|--|----------|
| 1. Make of door. | _____ |
| 2. Type of door. | _____ |
| 3. Noise level | _____ |
| 4. Weight of door | _____ |
| 5. STC value of door | _____ |
| 6. Size of door. | _____ |
| 7. Material of door. | _____ |
| 8. Material of hardware | _____ |
| 9. Thickness of body | _____ |
| 10. Details of fixing | _____ |
| 11. Guarantee & test certificates as per purchase spec. | YES / NO |
| 12. Is there any deviation from purchase spec. (if yes, vendor to specify) | YES / NO |
| 13. Cross sectional drawing attached. | YES / NO |
| 14. Marking on each door shall be as per std. | YES / NO |
| 15. Hardware & Installation materials | YES / NO |

Name of vendor _____

BHEL Enquiry No. _____

Signature and stamp of vendor

Date. _____

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ANNEXURE-II

TECHNICAL PARAMETERS OF ELECTRIC MOTOR (To be filled in by the vendor and submitted along with the offer)

1. Manufacturer -
2. Frame size -
3. Type of electric motor & no. of phases -
4. Applicable standard -
5. KW rating & rated output at 50 deg C -
6. Duty type -
7. Type of mounting -
8. Insulation class -
9. Temperature rise over 50 deg C -
10. Type of enclosure and ventilation -
11. Degree of protection -
12. Rated voltage & frequency variation -
13. Combined voltage & frequency variation -
14. Minimum voltage for starting -
15. Rated current -
16. Rated speed -
17. Rated torque (kg-m) -
18. Connection (Star or Delta) -

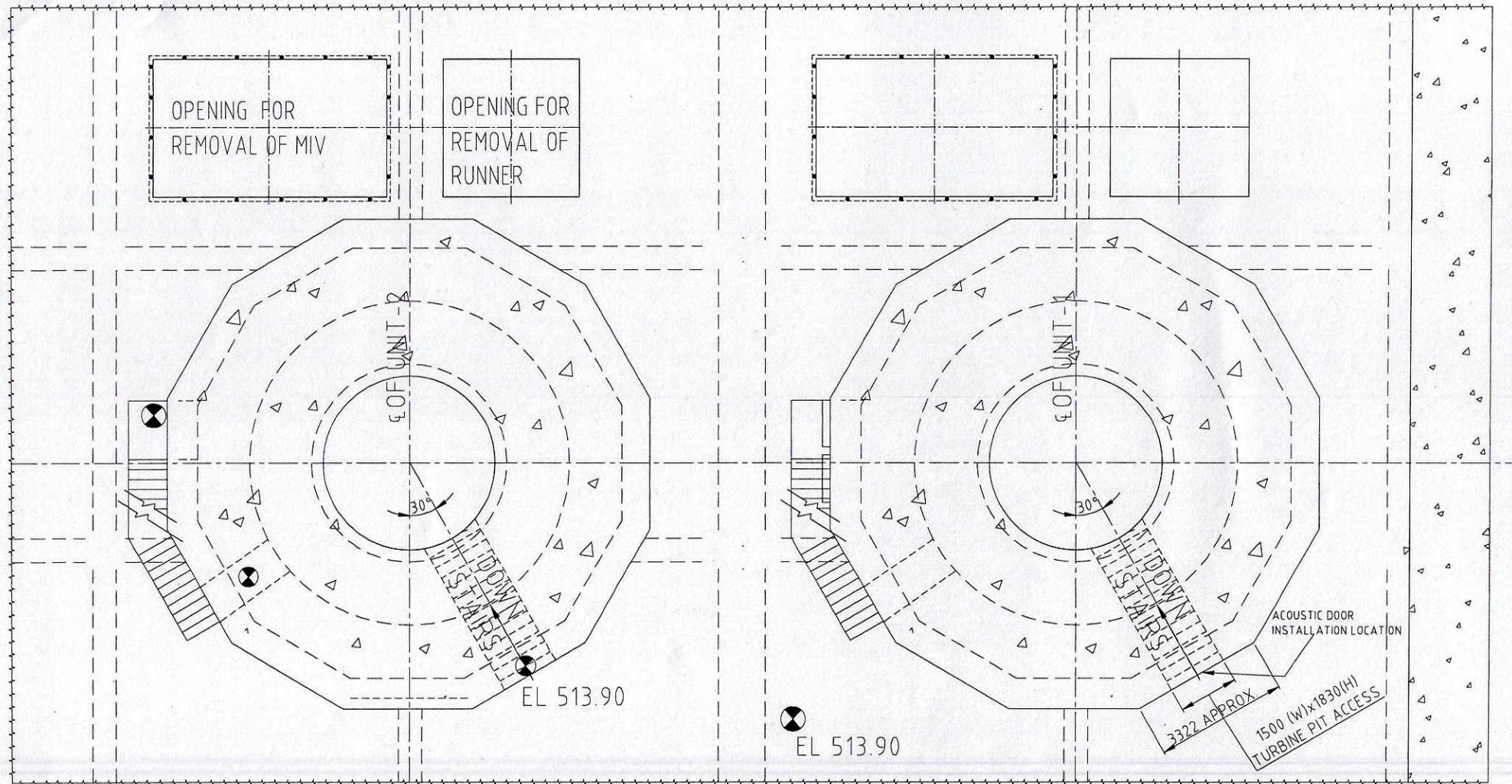
Name of vendor

BHEL Enquiry No.

Signature and stamp of vendor

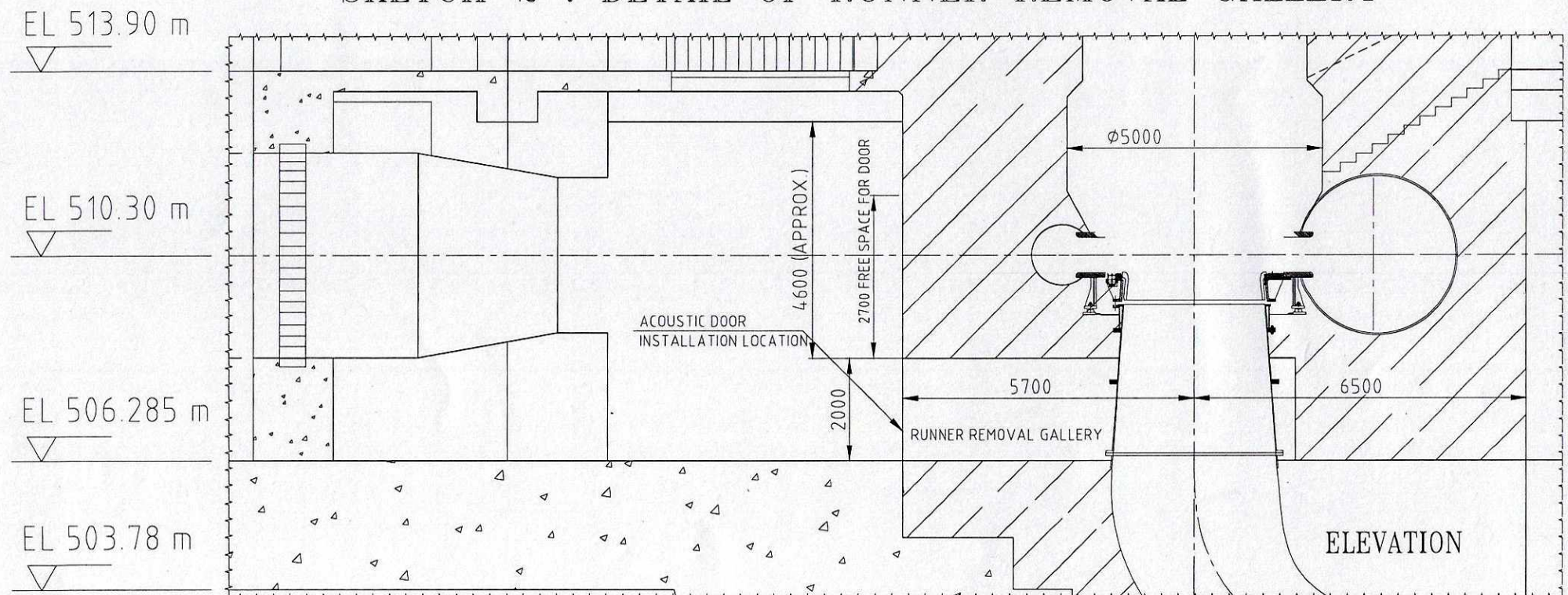
Date.

SKETCH-1 : DETAIL OF TURBINE PIT

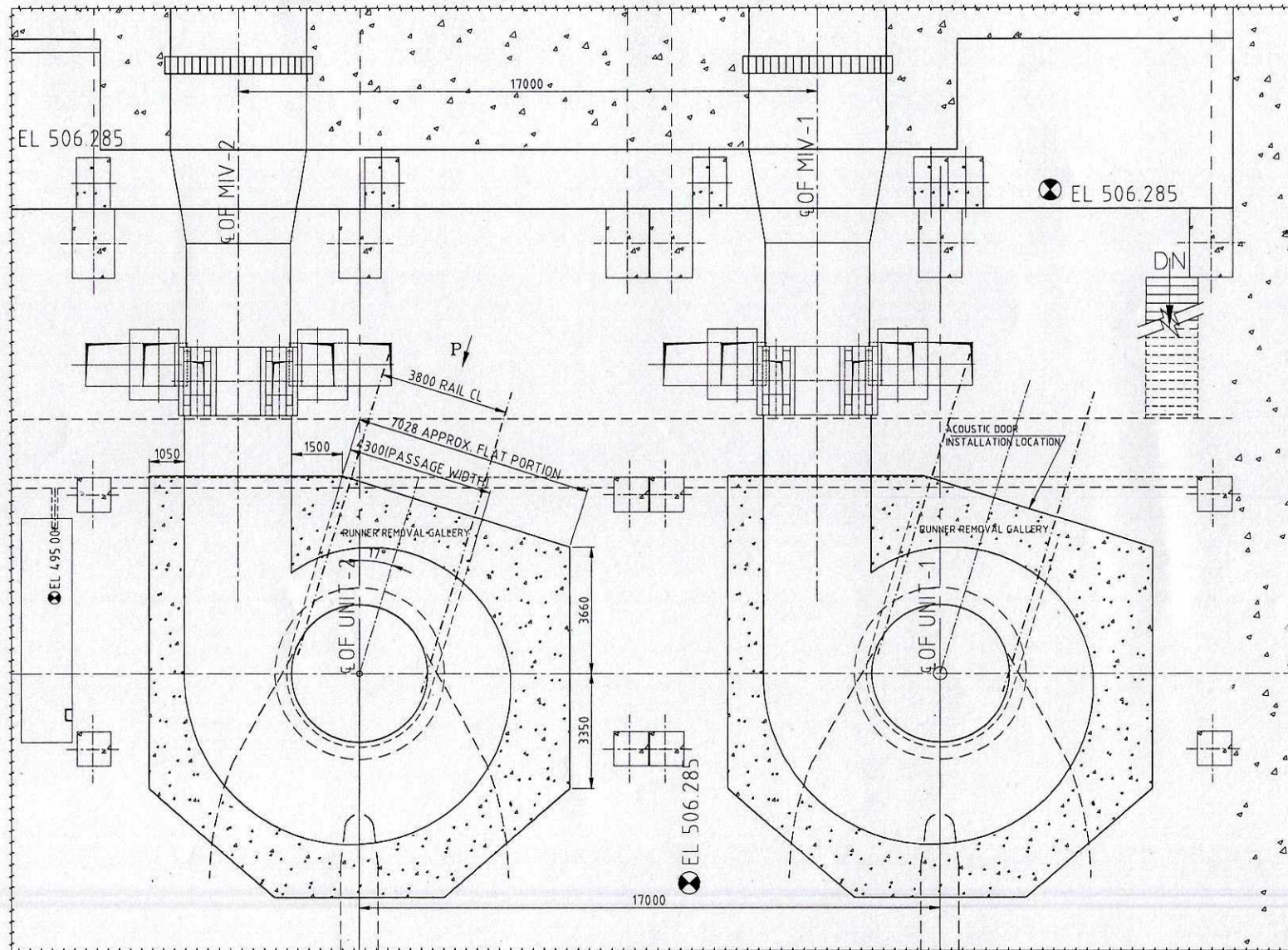


PLAN OF POWER HOUSE AT EL 513.900 m

SKETCH-2 : DETAIL OF RUNNER REMOVAL GALLERY

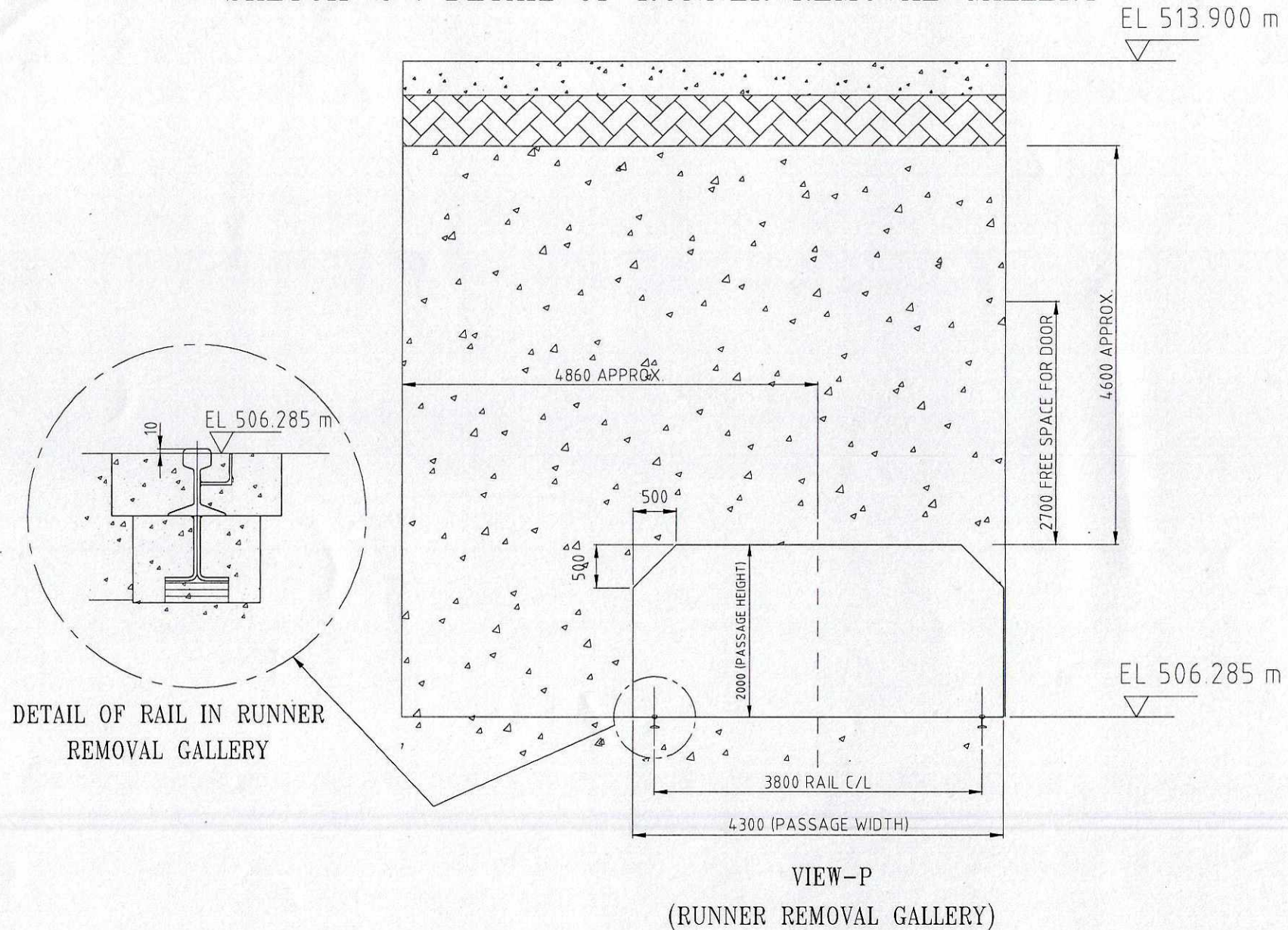


SKETCH-2 : DETAIL OF RUNNER REMOVAL GALLERY



PLAN OF POWER HOUSE AT EL. 506.28 / 510.30M
(VALVE FLOOR / TURBINE FLOOR)

SKETCH-2 : DETAIL OF RUNNER REMOVAL GALLERY



SKETCH-1 : DETAIL OF TURBINE PIT

