

# Site Information & Scope of Work

## Site Information

Site Name : Valve Station M  
Site Code : 10-RAS-404

Site Address : To be provided later.

Coordinates : N 24° 16' 09.0 " : E 91° 30' 09.6 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

Site Type

<input type="checkbox"/> Control Center	<input type="checkbox"/> Master Telemetry Station
<input type="checkbox"/> Gas Field	<input type="checkbox"/> Operating Company Terminal (OCT)
<input type="checkbox"/> CGS (City Gas Station)	<input type="checkbox"/> Power station/Fertilizer Factory
<input type="checkbox"/> Compressor Station	<input type="checkbox"/> TBS (Town Bordering Station)
<input type="checkbox"/> Pig Station	<input type="checkbox"/> DRS (District Regulating Station)
<input type="checkbox"/> MS (Metering Station)	<input type="checkbox"/> GMS (Gas Manifold Station)
<input checked="" type="checkbox"/> VS (Valve Station)	

Site Status

- Originally covered by The Existing System and shall be covered by The New System.
- Currently not covered by The Existing System but shall be covered by The New System.
- Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : GTCL

Remarks : \_\_\_\_\_  
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## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

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- : RTU
  - RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Display monitor
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - Interface with flow computer  
Make provision for:
    - Installation of the flow computer which shall be prepared by GTCL in the enclosure
    - Interface between RTU and the said flow computer
  - Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

- Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.

- Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

■ : Instruments

- Existing instruments  
Re-use the existing instruments and cables.

*Note:*

*Existing instruments and cables shall be serviced by the Employer.*

- New Instruments  
Design, supply and install the following instruments.  
Output signals from instruments are to be cabled via field junction box to the RTU.

■ : Pressure transmitters Q'ty

- Design, supply and intall:
  - Pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the pressure transmitter, and design, supply and install:
  - Pressure transmitter on the prepared tapping point
  - Tubing between tapping point and transmitter

■ : Differential pressure transmitters Q'ty

- Design, supply and install:
  - Differential pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the differential pressure transmitter, and design, supply and install:
  - Differential pressure transmitter on the tapping point
  - Tubing between tapping point and transmitter

■ : Temprature transmitters Q'ty

- Design, supply and install:
  - Thermowell in the spare boss on the pipe
  - Resistance temperature detector complete with a head mounted transmitter into the thermowell

■ : Limit switch Q'ty

- Design, supply and install the limit switch on the existing shutdown valve for valve position monitoring.

- Pick up Signal from the Existing Turbine Meter Q'ty  
Supply and install a dual pulse output pickup head in place of the single pulse output pickup in the existing turbine flowmeter sensor head. The output signal from the existing turbine flowmeter to be cabled via junction box to RTU.

- Local Field Instrument Junction Box Q'ty  
Design, supply and install an Intrinsic safety junction box. The junction box to be suitable for glanding appropriate cables.

- Instrument Cables  
Design, supply, install the instrument cables from the field instruments to RTU via junction box including each cable termination with gland.

## 2. Communication System

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### ■ : Slave Telemetry System

- Removal of existing slave telemetry equipment  
Remove and dispose the existing slave telemetry system including antenna and cable.
- Slave Telemetry Equipment  
Design, supply and install new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Slave Telemetry Equipment (design & supply only)  
Design and supply new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Existing monopole  
Re-use existing monopole to mount new antenna.
- New monopole  
Design, supply and install new monopole with foundation to mount new antenna.
- New monopole (design & supply only)  
Design and supply new monopole to mount new antenna.

## 3. Electrical Works

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### ■ : Power Supply to RTU

- Electrical power shall be supplied to RTU from existing PDB, and existing power cable shall be re-used.
- Design, supply and install MCB box for the power supply to RTU including all cables from existing PDB to MCB box and from MCB box to RTU.
- Design, supply and install power controller and power cable to RTU at remote site where electrical power is supplied from existing solar panel.
- Design, supply and install new solar panel, power controller and power cable to RTU.

## 4. Civil Works

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### ■ : Foundation & Sunshade for RTU

- Re-use existing foundation & sunshade for RTU  
Examine the condition of existing foundation and sunshade for RTU and repair the defects, if any.
- Provide new foundation & sunshade for RTU  
Design and construct the foundation and sunshade for new RTU at suitable location. The foundation and sunshade should be designed to suitably accommodate new RTU.

### ■ : Instrument Stand with Foundation & Sunshade

- Re-use existing Instrument stand(s) with foundation & sunshade  
Examine the condition of existing Instrument stand(s) with foundation & sunshade and repair the defects, if any.
- Provide new Instrument stand(s) with foundation & sunshade  
Design and construct the Instrument stand(s) with foundation & sunshade at suitable location. It should be designed to suitably accommodate the required number of instruments and explosion proof instrument field junction box.

## 5. Site Photo

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Site view

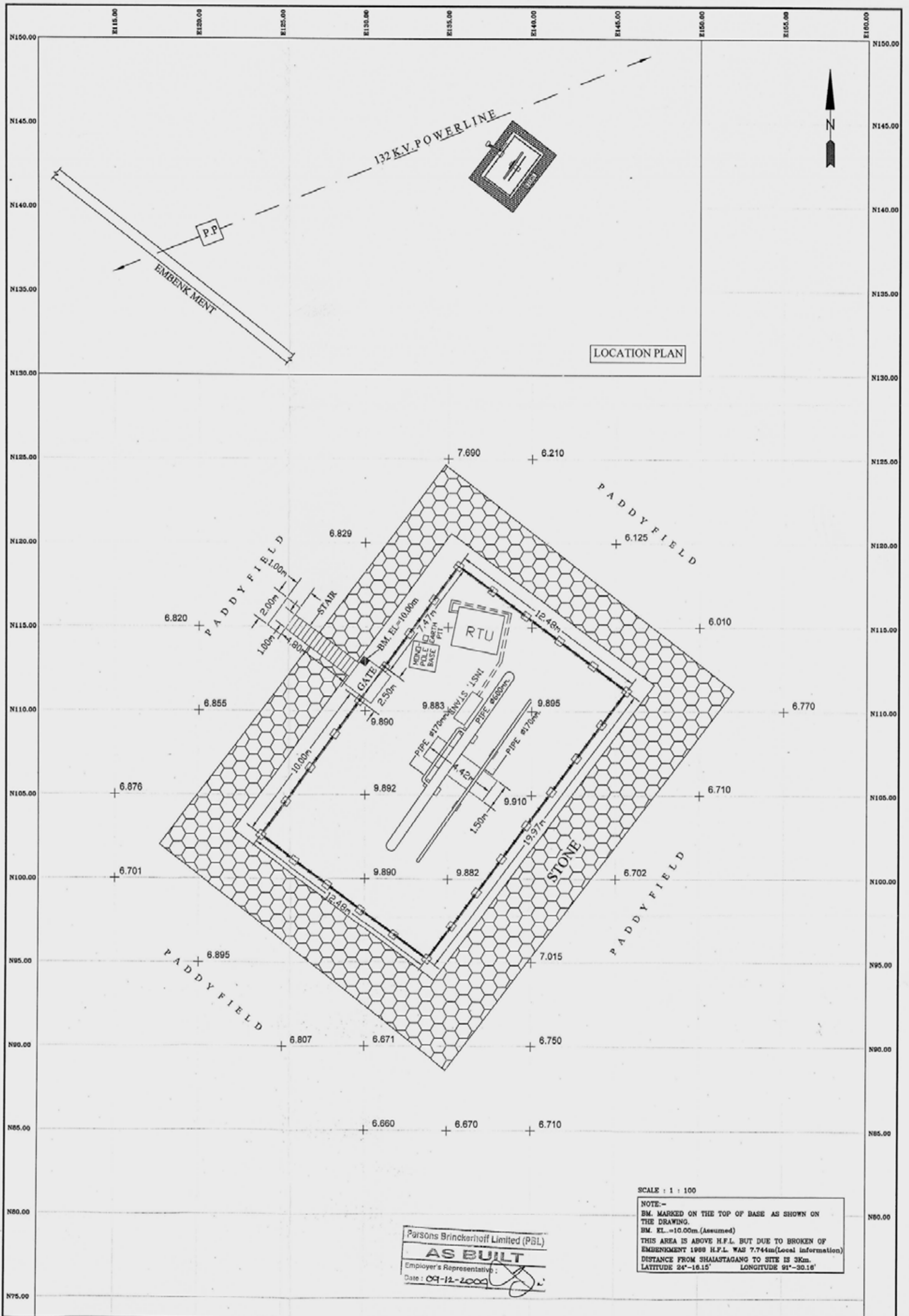


Existing Instrument Stand

## 6. Site Layout

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See attached Layout Plan.



LOCATION PLAN

SCALE : 1 : 100

NOTE:-  
 BM. MARKED ON THE TOP OF BASE AS SHOWN ON THE DRAWING.  
 BM. EL.=10.00m.(Assumed)  
 THIS AREA IS ABOVE H.F.L. BUT DUE TO BROKEN OF EMBANKMENT 1988 H.F.L. WAS 7.744m(Local information)  
 DISTANCE FROM SHAIASTAGANG TO SITE IS 3Km.  
 LATITUDE 24°-16.15' LONGITUDE 91°-30.16'

Parsons Brinckerhoff Limited (PBL)  
**AS BUILT**  
 Employer's Representative:  
 Date: 09-12-2009

ISSUE	Revision	Date	D.G. Ref	Contractor	Sub Contractor	S.D. No.	Employer
A	ISSUED FOR DESIGN APPROVAL	-	-		SURVEY CORPORATION		GAS TRANSMISSION COMPANY Ltd (GTCL)
B	ISSUED FOR DESIGN APPROVAL	06-11-04	-				

<b>CONTRACT DRAWING APPROVAL</b> Drawing Status: DESIGN APPROVAL <input type="checkbox"/> REQUIRED CHANGES <input checked="" type="checkbox"/> APPROVED NO CHANGES		Drawing Title: SITE CODE: 415 SITE NAME: VSM	
PRINT NAME: _____ SIGNED: _____ DATE: _____		Drawing No: 415-60-72 Rev: _____ Sheet: _____ Orig. Size: A1	
By: _____ Date: _____		Checked: _____ Approved: _____	

Consultant: <b>PB Technologies Ltd.</b>	Employer Contract No: GTCL/RL-1109/C2
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# Site Information & Scope of Work

## Site Information

Site Name : Rashidpur/Muchai Compressor Station  
Site Code : 10-RAS-405

Site Address : To be provided later.

Coordinates : N 24° 17' 42.9 " : E 91° 35' 09.0 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

Site Type

<input type="checkbox"/> Control Center	<input type="checkbox"/> Master Telemetry Station
<input type="checkbox"/> Gas Field	<input type="checkbox"/> Operating Company Terminal (OCT)
<input type="checkbox"/> CGS (City Gas Station)	<input type="checkbox"/> Power station/Fertilizer Factory
<input checked="" type="checkbox"/> Compressor Station	<input type="checkbox"/> TBS (Town Bordering Station)
<input type="checkbox"/> Pig Station	<input type="checkbox"/> DRS (District Regulating Station)
<input type="checkbox"/> MS (Metering Station)	<input type="checkbox"/> GMS (Gas Manifold Station)
<input type="checkbox"/> VS (Valve Station)	

Site Status

- Originally covered by The Existing System and shall be covered by The New System.
- Currently not covered by The Existing System but shall be covered by The New System.
- Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : GTCL

Remarks : \_\_\_\_\_  
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## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

- : RTU
  - RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Display monitor
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - Interface with flow computer  
Make provision for:
    - Installation of the flow computer which shall be prepared by GTCL in the enclosure
    - Interface between RTU and the said flow computer
  - Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

- Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.
  
- Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

## **2. Communication System**

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- : Slave Telemetry System
  - Removal of existing slave telemetry equipment  
Remove and dispose the existing slave telemetry system including antenna and cable.
  
  - Slave Telemetry Equipment  
Design, supply and install new slave telemetry equipment in the RTU enclosure, including cables and antenna.
  
  - Slave Telemetry Equipment (design & supply only)  
Design and supply new slave telemetry equipment in the RTU enclosure, including cables and antenna.
  
  - Existing monopole  
Re-use existing monopole to mount new antenna.
  
  - New monopole  
Design, supply and install new monopole with foundation to mount new antenna.
  
  - New monopole (design & supply only)  
Design and supply new monopole to mount new antenna.

### 3. Electrical Works

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■ : No electrical works at this site.

### 4. Civil Works

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■ : No civil works at this site.

### 5. Site Photo

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Site view



## **6. Site Layout**

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Site layout shall be provided later.

# Site Information & Scope of Work

## Site Information

Site Name : VS Chunarughat R-A Line  
Site Code : 10-RAS-406

Site Address : To be provided later.

Coordinates : N 24° 15' 37.6 " : E 91° 28' 58.8 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

Site Type

<input type="checkbox"/> Control Center	<input type="checkbox"/> Master Telemetry Station
<input type="checkbox"/> Gas Field	<input type="checkbox"/> Operating Company Terminal (OCT)
<input type="checkbox"/> CGS (City Gas Station)	<input type="checkbox"/> Power station/Fertilizer Factory
<input type="checkbox"/> Compressor Station	<input type="checkbox"/> TBS (Town Bordering Station)
<input type="checkbox"/> Pig Station	<input type="checkbox"/> DRS (District Regulating Station)
<input type="checkbox"/> MS (Metering Station)	<input type="checkbox"/> GMS (Gas Manifold Station)
<input checked="" type="checkbox"/> VS (Valve Station)	

Site Status

- Originally covered by The Existing System and shall be covered by The New System.
- Currently not covered by The Existing System but shall be covered by The New System.
- Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : GTCL

Remarks : \_\_\_\_\_  
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## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

---

- : RTU
  - RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Display monitor
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - Interface with flow computer  
Make provision for:
    - Installation of the flow computer which shall be prepared by GTCL in the enclosure
    - Interface between RTU and the said flow computer
  - Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

- Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.

- Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

■ : Instruments

- Existing instruments  
Re-use the existing instruments and cables.

*Note:*

*Existing instruments and cables shall be serviced by the Employer.*

- New Instruments  
Design, supply and install the following instruments.  
Output signals from instruments are to be cabled via field junction box to the RTU.

■ : Pressure transmitters Q'ty

- Design, supply and intall:
  - Pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the pressure transmitter, and design, supply and install:
  - Pressure transmitter on the prepared tapping point
  - Tubing between tapping point and transmitter[ 1 ]

■ : Differential pressure transmitters Q'ty

- Design, supply and install:
  - Differential pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the differential pressure transmitter, and design, supply and install:
  - Differential pressure transmitter on the tapping point
  - Tubing between tapping point and transmitter

■ : Temprature transmitters Q'ty

- Design, supply and install:
  - Thermowell in the spare boss on the pipe
  - Resistance temperature detector complete with a head mounted transmitter into the thermowell

■ : Limit switch Q'ty

- Design, supply and install the limit switch on the existing shutdown valve for valve position monitoring. [ 1 ]

Pick up Signal from the Existing Turbine Meter Q'ty

- Supply and install a dual pulse output pickup head in place of the single pulse output pickup in the existing turbine flowmeter sensor head. The output signal from the existing turbine flowmeter to be cabled via junction box to RTU.

Local Field Instrument Junction Box Q'ty

- Design, supply and install an Intrinsic safety junction box. The junction box to be suitable for glanding appropriate cables. [ 1 ]

Instrument Cables

- Design, supply, install the instrument cables from the field instruments to RTU via junction box including each cable termination with gland.

## 2. Communication System

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### ■ : Slave Telemetry System

- Removal of existing slave telemetry equipment  
Remove and dispose the existing slave telemetry system including antenna and cable.
- Slave Telemetry Equipment  
Design, supply and install new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Slave Telemetry Equipment (design & supply only)  
Design and supply new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Existing monopole  
Re-use existing monopole to mount new antenna.
- New monopole  
Design, supply and install new monopole with foundation to mount new antenna.
- New monopole (design & supply only)  
Design and supply new monopole to mount new antenna.

## 3. Electrical Works

---

### ■ : Power Supply to RTU

- Electrical power shall be supplied to RTU from existing PDB, and existing power cable shall be re-used.
- Design, supply and install MCB box for the power supply to RTU including all cables from existing PDB to MCB box and from MCB box to RTU.
- Design, supply and install power controller and power cable to RTU at remote site where electrical power is supplied from existing solar panel.
- Design, supply and install new solar panel, power controller and power cable to RTU.

## 4. Civil Works

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### ■ : Foundation & Sunshade for RTU

- Re-use existing foundation & sunshade for RTU  
Examine the condition of existing foundation and sunshade for RTU and repair the defects, if any.
- Provide new foundation & sunshade for RTU  
Design and construct the foundation and sunshade for new RTU at suitable location. The foundation and sunshade should be designed to suitably accommodate new RTU.

### ■ : Instrument Stand with Foundation & Sunshade

- Re-use existing Instrument stand(s) with foundation & sunshade  
Examine the condition of existing Instrument stand(s) with foundation & sunshade and repair the defects, if any.
- Provide new Instrument stand(s) with foundation & sunshade  
Design and construct the Instrument stand(s) with foundation & sunshade at suitable location. It should be designed to suitably accommodate the required number of instruments and explosion proof instrument field junction box.

## 5. Site Photo

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Whole view of site



Site view

## 6. Site Layout

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Site layout shall be provided later.

# Site Information & Scope of Work

## Site Information

Site Name : Fenchugonj  
Site Code : 10-FCH-600/600M

Site Address : To be provided later.

Coordinates : N 24° 41' 16.9 " : E 91° 55' 16.5 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

Site Type

<input type="checkbox"/> Control Center	<input checked="" type="checkbox"/> Master Telemetry Station
<input type="checkbox"/> Gas Field	<input type="checkbox"/> Operating Company Terminal (OCT)
<input type="checkbox"/> CGS (City Gas Station)	<input checked="" type="checkbox"/> Power station/Fertilizer Factory
<input type="checkbox"/> Compressor Station	<input type="checkbox"/> TBS (Town Bordering Station)
<input type="checkbox"/> Pig Station	<input type="checkbox"/> DRS (District Regulating Station)
<input type="checkbox"/> MS (Metering Station)	<input type="checkbox"/> GMS (Gas Manifold Station)
<input type="checkbox"/> VS (Valve Station)	

Site Status

- Originally covered by The Existing System and shall be covered by The New System.
- Currently not covered by The Existing System but shall be covered by The New System.
- Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : JGTDSL

Remarks : Additional instruments are required at this site.  
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## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

---

- : RTU
  - RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Display monitor
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - Interface with flow computer  
Make provision for:
    - Installation of the flow computer which shall be prepared by GTCL in the enclosure
    - Interface between RTU and the said flow computer
  - Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.

Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

■ : Instruments

Existing instruments  
Re-use the existing instruments and cables.

*Note:*  
*Existing instruments and cables shall be serviced by the Employer.*

New Instruments  
Design, supply and install the following instruments.  
Output signals from instruments are to be cabled via field junction box to the RTU.

■ : Pressure transmitters Q'ty

Design, supply and intall:  
- Pressure transmitter on the existing spare tapping point  
- Tubing between tapping point and transmitter

Prepare the tapping point for the pressure transmitter, [ 1 ]  
and design, supply and install:  
- Pressure transmitter on the prepared tapping point  
- Tubing between tapping point and transmitter

■ : Differential pressure transmitters Q'ty

Design, supply and install:  
- Differential pressure transmitter on the existing spare tapping point  
- Tubing between tapping point and transmitter

Prepare the tapping point for the differential pressure transmitter, [ 2 ]  
and design, supply and install:  
- Differential pressure transmitter on the tapping point  
- Tubing between tapping point and transmitter

■ : Temprature transmitters Q'ty

Design, supply and install: [ 1 ]  
- Thermowell in the spare boss on the pipe  
- Resistance temperater detector complete with a head mounted transmitter into the thermowell

■ : Limit switch Q'ty

Design, supply and install the limit switch on the existing shutdown valve for valve position monitoring.

Pick up Signal from the Existing Turbine Meter Q'ty  
Supply and install a dual pulse output pickup head in place of the single pulse output pickup in the existing turbine flowmeter sensor head. The output signal from the existing turbine flowmeter to be cabled via junction box to RTU.

Local Field Instrument Junction Box Q'ty  
Design, supply and install an Intrinsic safety junction box. The junction box [ 1 ]  
to be suitable for glanding appropriate cables.

Instrument Cables  
Design, supply, install the instrument cables from the field instruments to RTU via junction box including each cable termination with gland.

## 2. Communication System

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- : Master Telemetry Station (Former Microwave Radio Station)
  - Removal of existing communication system  
Remove and dispose following existing items used for microwave transmission system:
    - Microwave equipment/facilities in the radio equipment room
    - Antenna mounted on the existing tower
    - Cables between radio equipment room and existing tower
  
  - Radio equipment to connect Master Telemetry Station with Provider's Access Point  
Design, supply and install IP radio equipment at existing radio equipment room to connect Master Telemetry Station with nearest Provider's Access Point (BTCL's AP), including all necessary cables, accessories and the antenna to be mounted on the existing tower.
  
  - Master telemetry equipment  
Design, supply and install master telemetry equipment at existing radio equipment room to connect with slave telemetry equipment, including all necessary cables, accessories and the antenna to be mounted on the existing tower.
  
  - Radio equipment to connect Master Telemetry Station with OCT  
Design, supply and install IP radio equipment at radio equipment room to connect Master Telemetry Station with Operating Company Terminal (OCT) at another site, including all necessary cables, accessories and the antenna to be mounted on the existing tower.
  
  - Radio equipment to connect Provider's Access Point with Master Telemetry Station  
Design, supply and install IP radio equipment at nearest BTCL's access point to connect BTCL's AP with Master Telemetry Station, including all necessary cables, accessories and the antenna with monopole.
  
  - Network equipment  
Design, supply and install all necessary Network equipment at radio equipment room of Master telemetry station as well as at nearest BTCL's access point.
  
  - Network cable to OCT  
Design, supply and install network cable between Master Telemetry Station and OCT which shall be installed within the same site.
  
- : IP PBX System
  - IP PBX main unit  
Design, supply and install IP PBX main unit with necessary accessories and spare parts.
  
  - Extension telephone set Q'ty  
Design, supply and install extension telephone set(s) with required cables. [ 2 ]

## 3. Electrical Works

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- : Power Supply to RTU
  - Electrical power shall be supplied to RTU from existing PDB, and existing power cable shall be re-used.
  
  - Design, supply and install MCB box for the power supply to RTU including all cables from existing PDB to MCB box and from MCB box to RTU.
  
  - Design, supply and intall power controller and power cable to RTU at remote site where electrical power is supplied from existing solar panel.
  
  - Design, supply and install new solar panel, power controller and power cable to RTU.
  
- : Backup Batteries for Radio Equipment at Master Station
  - Remove and dispose existing backup batteries for radio equipment.  
Supply & install new backup batteries with charger suitable to backup new radio equipment for 48 hours.
  
- : Replacement of Air conditioner at Radio room of Master Station
  - Remove and dispose existing window type air conditioner at raido room, and Supply & install new air conditioner suitably selected to maintain the specified temperature and humidity of radio room.
  
- : Supply of Portable Engine Generator Q'ty
  - Supply of the petrol and/or diesel driven 1 kVA portable engine generator [ 1 ]  
for the maintenance of remote site(s) without commercial power supply.



#### 4. Civil Works

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- : Foundation & Sunshade for RTU
  - Re-use existing foundation & sunshade for RTU  
Examine the condition of existing foundation and sunshade for RTU and repair the defects, if any.
  - Provide new foundation & sunshade for RTU  
Design and construct the foundation and sunshade for new RTU at suitable location. The foundation and sunshade should be designed to suitably accommodate new RTU.
  
- : Instrument Stand with Foundation & Sunshade
  - Re-use existing Instrument stand(s) with foundation & sunshade  
Examine the condition of existing Instrument stand(s) with foundation & sunshade and repair the defects, if any.
  - Provide new Instrument stand(s) with foundation & sunshade  
Design and construct the Instrument stand(s) with foundation & sunshade at suitable location. It should be designed to suitably accommodate the required number of instruments and explosion proof instrument field junction box.
  
- : Refurbishment of Existing Radio Building/Radio Equipment Room
  - Refurbishment of Radio Building  
Examine the condition of the whole existing radio building and repair the defects if any.  
Clean and touch-up the external and internal finish of the whole existing radio building.
  - Refurbishment of Radio Equipment Room  
Examine the condition of existing rooms where radio equipment and backup batteries are installed and repair the defects if any.  
Clean and touch-up the internal finish of the said rooms.
  - Cleaning of Radio Equipment Room  
Clean and tidy up the existing rooms where radio equipment and backup batteries are installed.

#### 5. Site Photo

---



Existing Radio Building

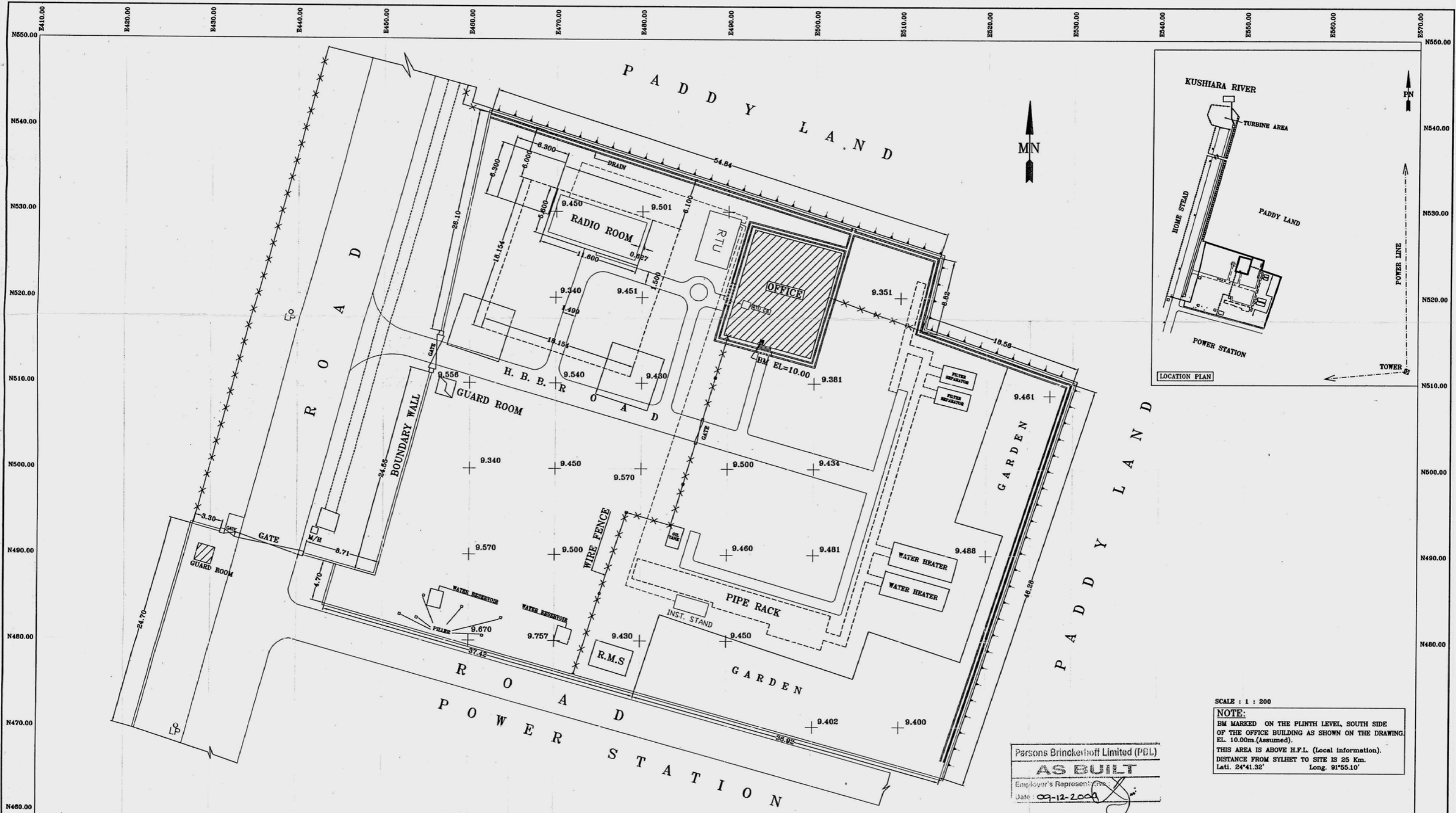


Existing RTU (cable link)

## **6. Site Layout**

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See attached Layout Plan.



Parsons Brinckerhoff Limited (PBL)  
**AS BUILT**  
 Employer's Representative: [Signature]  
 Date: 09-12-2009

SCALE : 1 : 200  
 NOTE:  
 BM MARKED ON THE PLINTH LEVEL, SOUTH SIDE OF THE OFFICE BUILDING AS SHOWN ON THE DRAWING. EL. 10.00m (Assumed).  
 THIS AREA IS ABOVE H.F.L. (Local Information).  
 DISTANCE FROM SYLHET TO SITE IS 25 Km.  
 Lat. 24°41.32' Long. 91°55.10'

ISSUE	Revision	Date	D.D. Ref	Contractor	Sub Contractor	S.D. No.	Employer
A	ISSUED FOR DESIGN APPROVAL			[Signature]	SURVEY CORPORATION		GAS TRANSMISSION COMPANY Ltd (GTCL)
B	ISSUED FOR DESIGN APPROVAL	07-11-04					
CONTRACT DRAWING APPROVAL Drawing Status: DESIGN APPROVAL <input type="checkbox"/> REDEFINED CHANGES <input type="checkbox"/> APPROVED NO CHANGES PRINT NAME: _____ DATE: _____ SIGNED: _____				Drawing Title: SITE CODE : 604 SITE NAME : FENCHUGANJ (60MW)		THE BANGLADESH GAS INFRASTRUCTURE DEVELOPMENT PROJECT. SUPERVISORY CONTROL, DATA ACQUISITION AND TELECOMMUNICATIONS SYSTEMS.	
				Drawing No. 604-60-72 Rev B Drawn: H.A. HAYAT, 23-03-99 Checked: M.A. HAYAT, 23-03-99 Approved: M.A. HADAYET, 23-03-99		Consultant: PB Technologies Ltd. Employer Contract No: GTCL/RL-1109/C2	

# Site Information & Scope of Work

## Site Information

Site Name : Valve Station E  
Site Code : 10-FCH-401

Site Address : To be provided later.

Coordinates : N 24° 41' 24.0 " : E 91° 55' 13.2 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

Site Type

<input type="checkbox"/> Control Center	<input type="checkbox"/> Master Telemetry Station
<input type="checkbox"/> Gas Field	<input type="checkbox"/> Operating Company Terminal (OCT)
<input type="checkbox"/> CGS (City Gas Station)	<input type="checkbox"/> Power station/Fertilizer Factory
<input type="checkbox"/> Compressor Station	<input type="checkbox"/> TBS (Town Bordering Station)
<input type="checkbox"/> Pig Station	<input type="checkbox"/> DRS (District Regulating Station)
<input type="checkbox"/> MS (Metering Station)	<input type="checkbox"/> GMS (Gas Manifold Station)
<input checked="" type="checkbox"/> VS (Valve Station)	

Site Status

- Originally covered by The Existing System and shall be covered by The New System.
- Currently not covered by The Existing System but shall be covered by The New System.
- Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : GTCL

Remarks : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

---

- : RTU
  - RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Display monitor
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - Interface with flow computer  
Make provision for:
    - Installation of the flow computer which shall be prepared by GTCL in the enclosure
    - Interface between RTU and the said flow computer
  - Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

- Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.

- Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

■ : Instruments

- Existing instruments  
Re-use the existing instruments and cables.

*Note:*

*Existing instruments and cables shall be serviced by the Employer.*

- New Instruments  
Design, supply and install the following instruments.  
Output signals from instruments are to be cabled via field junction box to the RTU.

■ : Pressure transmitters Q'ty

- Design, supply and intall:
  - Pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the pressure transmitter, and design, supply and install:
  - Pressure transmitter on the prepared tapping point
  - Tubing between tapping point and transmitter

■ : Differential pressure transmitters Q'ty

- Design, supply and install:
  - Differential pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the differential pressure transmitter, and design, supply and install:
  - Differential pressure transmitter on the tapping point
  - Tubing between tapping point and transmitter

■ : Temprature transmitters Q'ty

- Design, supply and install:
  - Thermowell in the spare boss on the pipe
  - Resistance temperature detector complete with a head mounted transmitter into the thermowell

■ : Limit switch Q'ty

- Design, supply and install the limit switch on the existing shutdown valve for valve position monitoring.

- Pick up Signal from the Existing Turbine Meter Q'ty  
Supply and install a dual pulse output pickup head in place of the single pulse output pickup in the existing turbine flowmeter sensor head. The output signal from the existing turbine flowmeter to be cabled via junction box to RTU.

- Local Field Instrument Junction Box Q'ty  
Design, supply and install an Intrinsic safety junction box. The junction box to be suitable for glanding appropriate cables.

- Instrument Cables  
Design, supply, install the instrument cables from the field instruments to RTU via junction box including each cable termination with gland.

## 2. Communication System

---

### ■ : Slave Telemetry System

- Removal of existing slave telemetry equipment  
Remove and dispose the existing slave telemetry system including antenna and cable.
- Slave Telemetry Equipment  
Design, supply and install new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Slave Telemetry Equipment (design & supply only)  
Design and supply new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Existing monopole  
Re-use existing monopole to mount new antenna.
- New monopole  
Design, supply and install new monopole with foundation to mount new antenna.
- New monopole (design & supply only)  
Design and supply new monopole to mount new antenna.

## 3. Electrical Works

---

### ■ : Power Supply to RTU

- Electrical power shall be supplied to RTU from existing PDB, and existing power cable shall be re-used.
- Design, supply and install MCB box for the power supply to RTU including all cables from existing PDB to MCB box and from MCB box to RTU.
- Design, supply and install power controller and power cable to RTU at remote site where electrical power is supplied from existing solar panel.
- Design, supply and install new solar panel, power controller and power cable to RTU.

## 4. Civil Works

---

### ■ : Foundation & Sunshade for RTU

- Re-use existing foundation & sunshade for RTU  
Examine the condition of existing foundation and sunshade for RTU and repair the defects, if any.
- Provide new foundation & sunshade for RTU  
Design and construct the foundation and sunshade for new RTU at suitable location. The foundation and sunshade should be designed to suitably accommodate new RTU.

### ■ : Instrument Stand with Foundation & Sunshade

- Re-use existing Instrument stand(s) with foundation & sunshade  
Examine the condition of existing Instrument stand(s) with foundation & sunshade and repair the defects, if any.
- Provide new Instrument stand(s) with foundation & sunshade  
Design and construct the Instrument stand(s) with foundation & sunshade at suitable location. It should be designed to suitably accommodate the required number of instruments and explosion proof instrument field junction box.

**5. Site Photo**

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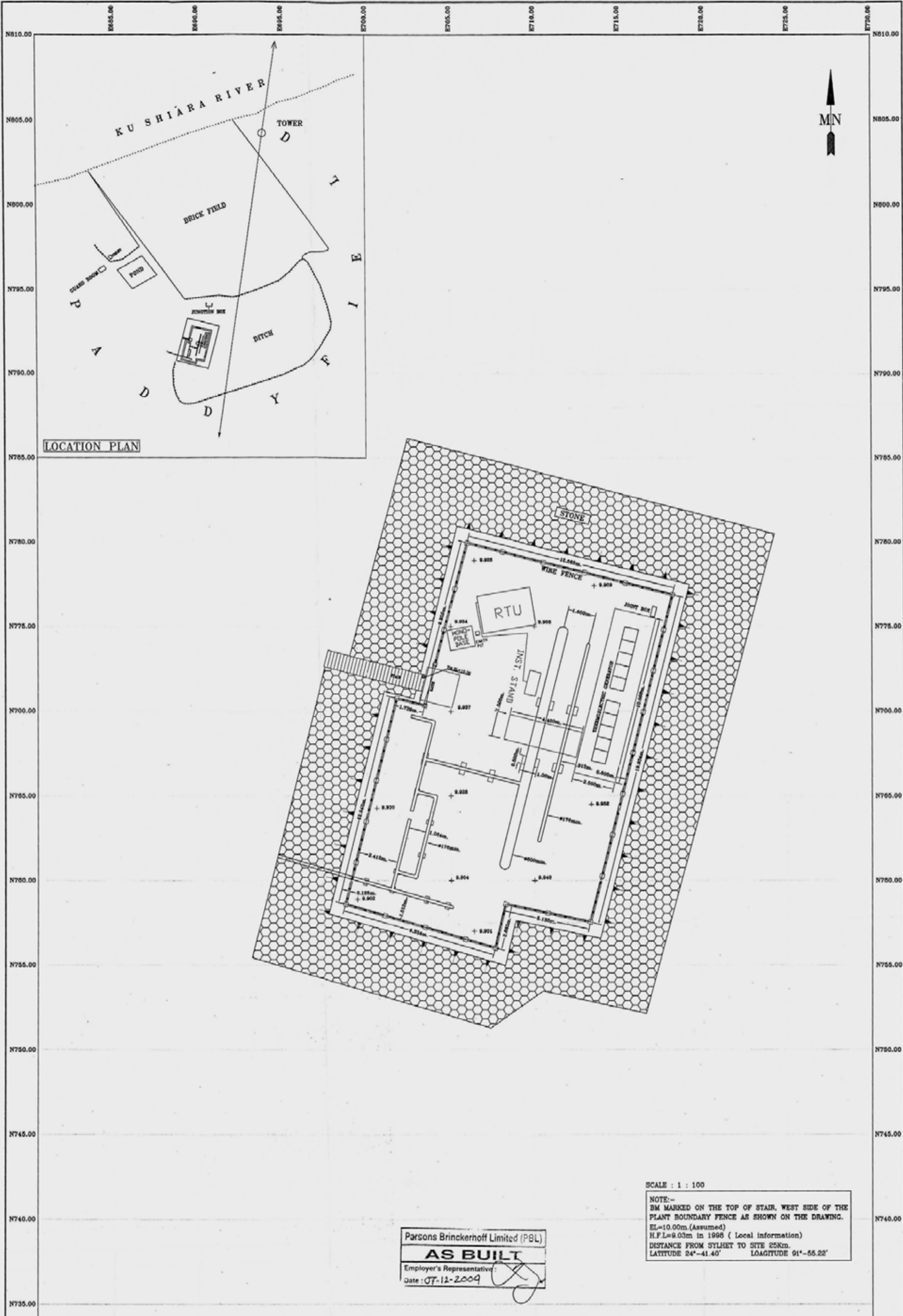


Existing RTU and Instrument Stand

**6. Site Layout**

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See attached Layout Plan.



LOCATION PLAN

SCALE : 1 : 100

NOTE:-  
 BM MARKED ON THE TOP OF STAIR, WEST SIDE OF THE  
 PLANT BOUNDARY FENCE AS SHOWN ON THE DRAWING.  
 EL.=10.00m (Assumed)  
 H.F.L.=9.03m in 1996 ( Local information)  
 DISTANCE FROM SYLHET TO SITE 25Km.  
 LATITUDE 24°-41.40' LONGITUDE 91°-55.22'

Parsons Brinckernoff Limited (PBL)  
**AS BUILT**  
 Employer's Representative:  
 Date: 07-12-2009

ISSUE	Revision	Date	D.D. Ref	Contractor	Sub Contractor	S.D. No.	Employer
A	ISSUED FOR DESIGN APPROVAL				SURVEY CORPORATION		GAS TRANSMISSION COMPANY Ltd (GTCL)
B	ISSUED FOR DESIGN APPROVAL	04-11-04					

<b>CONTRACT DRAWING APPROVAL</b> Drawing Status: DESIGN APPROVAL <input type="checkbox"/> REVISIONS CHANGES <input checked="" type="checkbox"/> APPROVED NO CHANGES		Drawing Title: SITE CODE : 406 SITE NAME : VSE Drawing No. 406-00-72 Rev: _____ Sheet: _____ Dwg. Size: A1 Desn: _____ Checkd: _____ Approved: _____ BY: _____ DATE: _____	THE BANGLADESH GAS INFRASTRUCTURE DEVELOPMENT PROJECT, SUPERVISORY CONTROL DATA ACQUISITION AND TELECOMMUNICATIONS SYSTEMS. Consultant: PB Technologies Ltd. Employer Contract No: GTCL/RL-1109/C2
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# Site Information & Scope of Work

## Site Information

Site Name : Valve Station D  
Site Code : 10-FCH-402

Site Address : To be provided later.

Coordinates : N 24° 41' 40.8 " : E 91° 55' 12.6 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

Site Type

<input type="checkbox"/> Control Center	<input type="checkbox"/> Master Telemetry Station
<input type="checkbox"/> Gas Field	<input type="checkbox"/> Operating Company Terminal (OCT)
<input type="checkbox"/> CGS (City Gas Station)	<input type="checkbox"/> Power station/Fertilizer Factory
<input type="checkbox"/> Compressor Station	<input type="checkbox"/> TBS (Town Bordering Station)
<input type="checkbox"/> Pig Station	<input type="checkbox"/> DRS (District Regulating Station)
<input type="checkbox"/> MS (Metering Station)	<input type="checkbox"/> GMS (Gas Manifold Station)
<input checked="" type="checkbox"/> VS (Valve Station)	

Site Status

- Originally covered by The Existing System and shall be covered by The New System.
- Currently not covered by The Existing System but shall be covered by The New System.
- Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : GTCL

Remarks : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

---

- : RTU
  - RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Display monitor
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - Interface with flow computer  
Make provision for:
    - Installation of the flow computer which shall be prepared by GTCL in the enclosure
    - Interface between RTU and the said flow computer
  - Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

- Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.

- Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

■ : Instruments

- Existing instruments  
Re-use the existing instruments and cables.

*Note:*

*Existing instruments and cables shall be serviced by the Employer.*

- New Instruments  
Design, supply and install the following instruments.  
Output signals from instruments are to be cabled via field junction box to the RTU.

■ : Pressure transmitters Q'ty

- Design, supply and intall:
  - Pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the pressure transmitter, and design, supply and install:
  - Pressure transmitter on the prepared tapping point
  - Tubing between tapping point and transmitter

■ : Differential pressure transmitters Q'ty

- Design, supply and install:
  - Differential pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the differential pressure transmitter, and design, supply and install:
  - Differential pressure transmitter on the tapping point
  - Tubing between tapping point and transmitter

■ : Temprature transmitters Q'ty

- Design, supply and install:
  - Thermowell in the spare boss on the pipe
  - Resistance temperature detector complete with a head mounted transmitter into the thermowell

■ : Limit switch Q'ty

- Design, supply and install the limit switch on the existing shutdown valve for valve position monitoring.

- Pick up Signal from the Existing Turbine Meter Q'ty  
Supply and install a dual pulse output pickup head in place of the single pulse output pickup in the existing turbine flowmeter sensor head. The output signal from the existing turbine flowmeter to be cabled via junction box to RTU.

- Local Field Instrument Junction Box Q'ty  
Design, supply and install an Intrinsic safety junction box. The junction box to be suitable for glanding appropriate cables.

- Instrument Cables  
Design, supply, install the instrument cables from the field instruments to RTU via junction box including each cable termination with gland.

## 2. Communication System

---

### ■ : Slave Telemetry System

- Removal of existing slave telemetry equipment  
Remove and dispose the existing slave telemetry system including antenna and cable.
- Slave Telemetry Equipment  
Design, supply and install new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Slave Telemetry Equipment (design & supply only)  
Design and supply new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Existing monopole  
Re-use existing monopole to mount new antenna.
- New monopole  
Design, supply and install new monopole with foundation to mount new antenna.
- New monopole (design & supply only)  
Design and supply new monopole to mount new antenna.

## 3. Electrical Works

---

### ■ : Power Supply to RTU

- Electrical power shall be supplied to RTU from existing PDB, and existing power cable shall be re-used.
- Design, supply and install MCB box for the power supply to RTU including all cables from existing PDB to MCB box and from MCB box to RTU.
- Design, supply and install power controller and power cable to RTU at remote site where electrical power is supplied from existing solar panel.
- Design, supply and install new solar panel, power controller and power cable to RTU.

## 4. Civil Works

---

### ■ : Foundation & Sunshade for RTU

- Re-use existing foundation & sunshade for RTU  
Examine the condition of existing foundation and sunshade for RTU and repair the defects, if any.
- Provide new foundation & sunshade for RTU  
Design and construct the foundation and sunshade for new RTU at suitable location. The foundation and sunshade should be designed to suitably accommodate new RTU.

### ■ : Instrument Stand with Foundation & Sunshade

- Re-use existing Instrument stand(s) with foundation & sunshade  
Examine the condition of existing Instrument stand(s) with foundation & sunshade and repair the defects, if any.
- Provide new Instrument stand(s) with foundation & sunshade  
Design and construct the Instrument stand(s) with foundation & sunshade at suitable location. It should be designed to suitably accommodate the required number of instruments and explosion proof instrument field junction box.

## 5. Site Photo

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Existing RTU

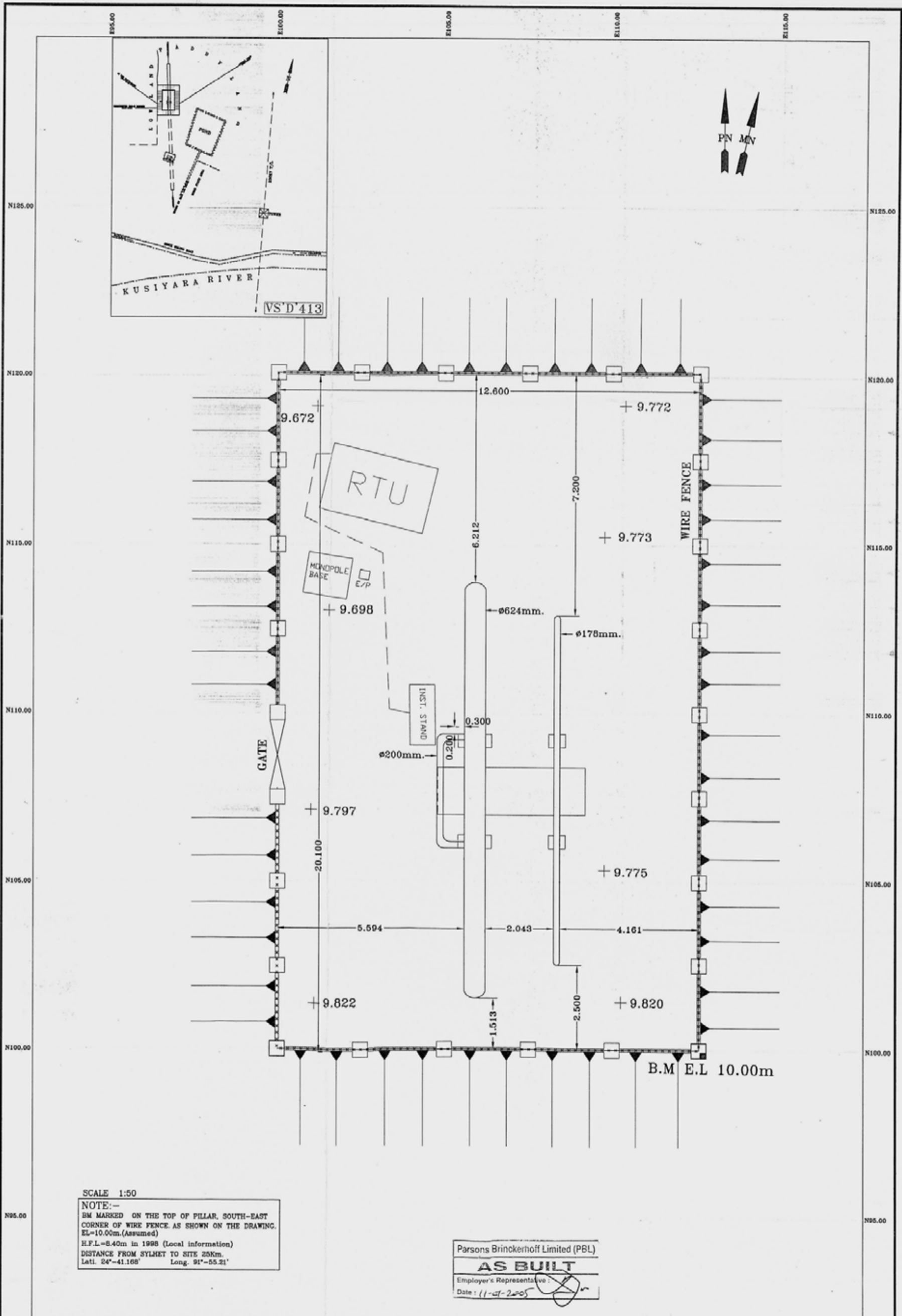


Existing Instrument Stand

## 6. Site Layout

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See attached Layout Plan.



ISSUE	Revision	Date	D.D. Ref	Contractor	Sub Contractor	I.D. No.	Employer
A	ISSUED FOR DESIGN APPROVAL				SURVEY CORPORATION		GAS TRANSMISSION COMPANY Ltd (GTCL)
B	ISSUED FOR DESIGN APPROVAL	07-31-04					

<b>CONTRACT DRAWING APPROVAL</b> Drawing Status: DESIGN APPROVAL <input type="checkbox"/> REQUIRED CHANGES <input checked="" type="checkbox"/> APPROVED NO CHANGES		Drawing Title: SURVEY CORPORATION SITE CODE: 413 SITE NAME: VSD		Drawing No: 413-60-72 Rev: 3 Sheet: 1 of 1 Drig. Size: A1		THE BANGLADESH GAS INFRASTRUCTURE DEVELOPMENT PROJECT, SUPERVISORY CONTROL, DATA ACQUISITION AND TELECOMMUNICATIONS SYSTEMS.	
PRINT NAME: <i>[Signature]</i>	SIGNED: <i>[Signature]</i>	DATE: <i>[Signature]</i>	Drawn: M.A. HAYAT	CHECKED: M.A. HADYET	Approved: M.A. HADYET	Consultant: PB Technologies Ltd.	Employer Contract No: GTCLR-1109/C2

# Site Information & Scope of Work

## Site Information

Site Name : Fenchugonj NGF  
Site Code : 10-FCH-601

Site Address : To be provided later.

Coordinates : N 24° 39' 39.0 " : E 91° 56' 13.8 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

Site Type

<input type="checkbox"/> Control Center	<input type="checkbox"/> Master Telemetry Station
<input type="checkbox"/> Gas Field	<input type="checkbox"/> Operating Company Terminal (OCT)
<input type="checkbox"/> CGS (City Gas Station)	<input checked="" type="checkbox"/> Power station/Fertilizer Factory
<input type="checkbox"/> Compressor Station	<input type="checkbox"/> TBS (Town Bordering Station)
<input type="checkbox"/> Pig Station	<input type="checkbox"/> DRS (District Regulating Station)
<input type="checkbox"/> MS (Metering Station)	<input type="checkbox"/> GMS (Gas Manifold Station)
<input type="checkbox"/> VS (Valve Station)	

Site Status

- Originally covered by The Existing System and shall be covered by The New System.
- Currently not covered by The Existing System but shall be covered by The New System.
- Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : JGTDSL

Remarks : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

---

- : RTU
  - RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Display monitor
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - Interface with flow computer  
Make provision for:
    - Installation of the flow computer which shall be prepared by GTCL in the enclosure
    - Interface between RTU and the said flow computer
  - Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

- Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.

- Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

■ : Instruments

- Existing instruments  
Re-use the existing instruments and cables.

*Note:*

*Existing instruments and cables shall be serviced by the Employer.*

- New Instruments  
Design, supply and install the following instruments.  
Output signals from instruments are to be cabled via field junction box to the RTU.

■ : Pressure transmitters Q'ty

- Design, supply and intall:
  - Pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the pressure transmitter, and design, supply and install:
  - Pressure transmitter on the prepared tapping point
  - Tubing between tapping point and transmitter

■ : Differential pressure transmitters Q'ty

- Design, supply and install:
  - Differential pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the differential pressure transmitter, and design, supply and install:
  - Differential pressure transmitter on the tapping point
  - Tubing between tapping point and transmitter

■ : Temprature transmitters Q'ty

- Design, supply and install:
  - Thermowell in the spare boss on the pipe
  - Resistance temperature detector complete with a head mounted transmitter into the thermowell

■ : Limit switch Q'ty

- Design, supply and install the limit switch on the existing shutdown valve for valve position monitoring.

- Pick up Signal from the Existing Turbine Meter Q'ty  
Supply and install a dual pulse output pickup head in place of the single pulse output pickup in the existing turbine flowmeter sensor head. The output signal from the existing turbine flowmeter to be cabled via junction box to RTU.

- Local Field Instrument Junction Box Q'ty  
Design, supply and install an Intrinsic safety junction box. The junction box to be suitable for glanding appropriate cables.

- Instrument Cables  
Design, supply, install the instrument cables from the field instruments to RTU via junction box including each cable termination with gland.

## 2. Communication System

---

### ■ : Slave Telemetry System

- Removal of existing slave telemetry equipment  
Remove and dispose the existing slave telemetry system including antenna and cable.
- Slave Telemetry Equipment  
Design, supply and install new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Slave Telemetry Equipment (design & supply only)  
Design and supply new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Existing monopole  
Re-use existing monopole to mount new antenna.
- New monopole  
Design, supply and install new monopole with foundation to mount new antenna.
- New monopole (design & supply only)  
Design and supply new monopole to mount new antenna.

## 3. Electrical Works

---

### ■ : Power Supply to RTU

- Electrical power shall be supplied to RTU from existing PDB, and existing power cable shall be re-used.
- Design, supply and install MCB box for the power supply to RTU including all cables from existing PDB to MCB box and from MCB box to RTU.
- Design, supply and install power controller and power cable to RTU at remote site where electrical power is supplied from existing solar panel.
- Design, supply and install new solar panel, power controller and power cable to RTU.

## 4. Civil Works

---

### ■ : Foundation & Sunshade for RTU

- Re-use existing foundation & sunshade for RTU  
Examine the condition of existing foundation and sunshade for RTU and repair the defects, if any.
- Provide new foundation & sunshade for RTU  
Design and construct the foundation and sunshade for new RTU at suitable location. The foundation and sunshade should be designed to suitably accommodate new RTU.

### ■ : Instrument Stand with Foundation & Sunshade

- Re-use existing Instrument stand(s) with foundation & sunshade  
Examine the condition of existing Instrument stand(s) with foundation & sunshade and repair the defects, if any.
- Provide new Instrument stand(s) with foundation & sunshade  
Design and construct the Instrument stand(s) with foundation & sunshade at suitable location. It should be designed to suitably accommodate the required number of instruments and explosion proof instrument field junction box.



## 5. Site Photo

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Site view

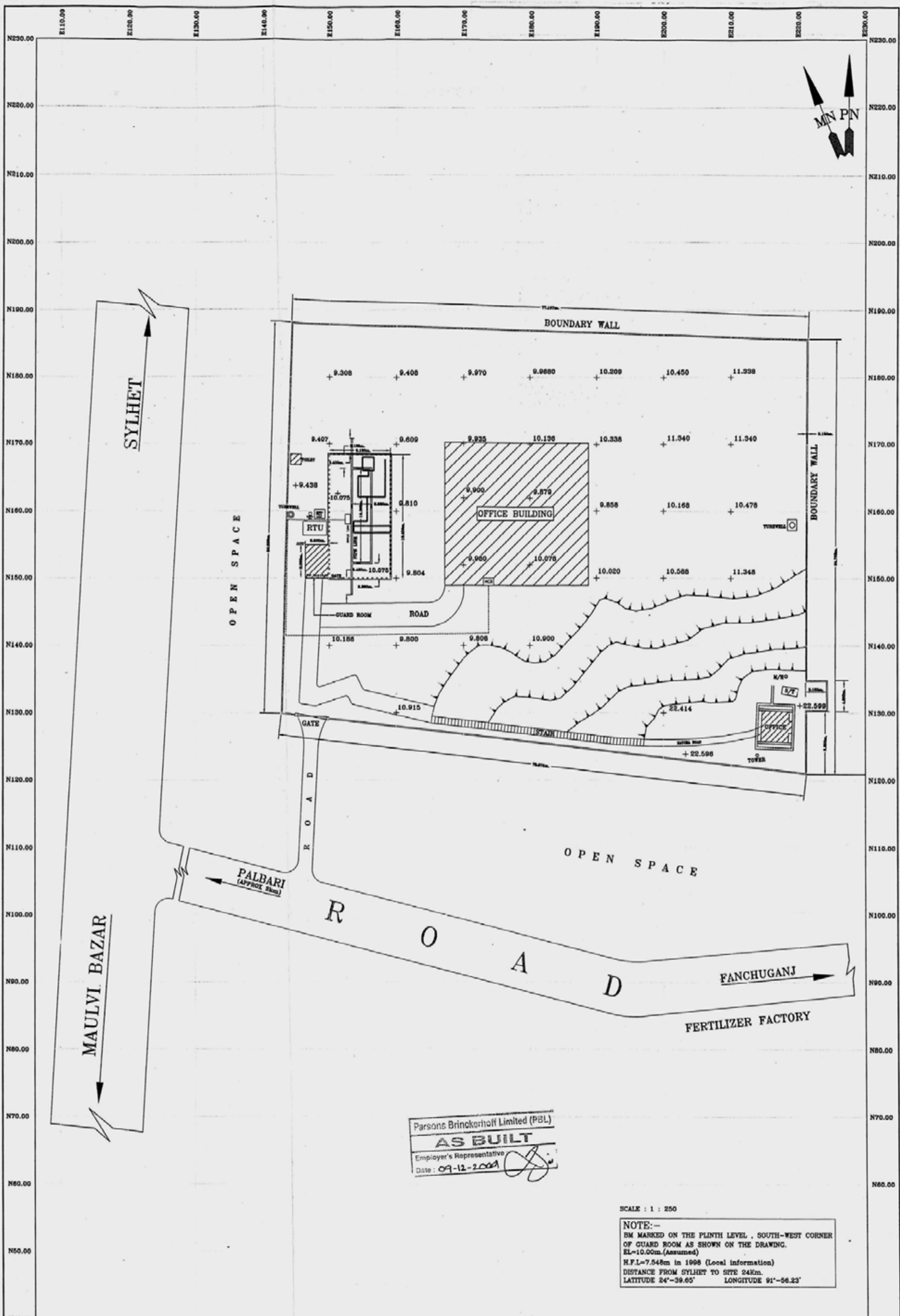


Existing Instrument Stand

## 6. Site Layout

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See attached Layout Plan.



Parsons Brinckerhoff Limited (PBL)  
**AS BUILT**  
 Employer's Representative  
 Date: 09-12-2009

SCALE : 1 : 250  
 NOTE:-  
 BM MARKED ON THE PLINTH LEVEL, SOUTH-WEST CORNER OF GUARD ROOM AS SHOWN ON THE DRAWING. EL=10.00m.(Assumed)  
 H.F.L.=7.548m in 1998 (Local information)  
 DISTANCE FROM SYLHET TO SITE 24Km.  
 LATITUDE 24°-39.65' LONGITUDE 91°-56.23'

Issue	Revision	Date	D.D. Ref	Contractor	Sub Contractor	S.D. No.	Employer
A	ISSUED FOR DESIGN APPROVAL				SURVEY CORPORATION		GAS TRANSMISSION COMPANY Ltd (GTCL)
B	ISSUED FOR DESIGN APPROVAL	04-11-04					

<b>CONTRACT DRAWING APPROVAL</b> Drawing Status: DESIGN APPROVAL <input type="checkbox"/> REQUIRED CHANGES <input type="checkbox"/> APPROVED NO CHANGES		Drawing Title: SITE CODE : 802 SITE NAME : FENCHUGONJ NGF		THE BANGLADESH GAS INFRASTRUCTURE DEVELOPMENT PROJECT. SUPERVISORY CONTROL, DATA ACQUISITION AND TELECOMMUNICATIONS SYSTEMS.	
Drawing No: 602-60-72 Rev: _____ Sheet: _____ Dwg. Size: A1	Drawn: _____ Checked: _____ Approved: _____	Consultant: PB Technologies Ltd.	Employer Contract No: GTCL/RL-1168/C2		

# Site Information & Scope of Work

## Site Information

Site Name : Fenchugonj Gas Field  
Site Code : 10-FCH-701

Site Address : To be provided later.

Coordinates : N 24° 36' 58.2 " : E 91° 57' 09.2 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

- Site Type
- |   |  |
|---|--|
| <input type="checkbox"/> Control Center         | <input type="checkbox"/> Master Telemetry Station          |
| <input checked="" type="checkbox"/> Gas Field   | <input type="checkbox"/> Operating Company Terminal (OCT)  |
| <input type="checkbox"/> CGS (City Gas Station) | <input type="checkbox"/> Power station/Fertilizer Factory  |
| <input type="checkbox"/> Compressor Station     | <input type="checkbox"/> TBS (Town Bordering Station)      |
| <input type="checkbox"/> Pig Station            | <input type="checkbox"/> DRS (District Regulating Station) |
| <input type="checkbox"/> MS (Metering Station)  | <input type="checkbox"/> GMS (Gas Manifold Station)        |
| <input type="checkbox"/> VS (Valve Station)     |  |

- Site Status
- Originally covered by The Existing System and shall be covered by The New System.
  - Currently not covered by The Existing System but shall be covered by The New System.
  - Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : BAPEX

Remarks : \_\_\_\_\_  
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## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

---

■ : RTU

- RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
  - RTU
  - Instrumentation and communication equipment
  - Backup battery system with charger for 24 hours
  - Lighting
  - Anti-condensation heater
  - Earthing and lightning protection
  - All internal wiring
  - Other equipment to satisfy the functional requirements
  
- RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
  - RTU
  - Display monitor
  - Instrumentation and communication equipment
  - Backup battery system with charger for 24 hours
  - Lighting
  - Anti-condensation heater
  - Earthing and lightning protection
  - All internal wiring
  - Other equipment to satisfy the functional requirements
  
- RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
  - RTU
  - Instrumentation and communication equipment
  - Backup battery system with charger for 24 hours
  - Lighting
  - Anti-condensation heater
  - Earthing and lightning protection
  - All internal wiring
  - Other equipment to satisfy the functional requirements
  
- Interface with flow computer  
Make provision for:
  - Installation of the flow computer which shall be prepared by GTCL in the enclosure
  - Interface between RTU and the said flow computer
  
- Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.

Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

■ : Instruments

Existing instruments  
Re-use the existing instruments and cables.

*Note:*

*Existing instruments and cables shall be serviced by the Employer.*

New Instruments  
Design, supply and install the following instruments.  
Output signals from instruments are to be cabled via field junction box to the RTU.

■ : Pressure transmitters Q'ty

Design, supply and intall:  
- Pressure transmitter on the existing spare tapping point  
- Tubing between tapping point and transmitter

Prepare the tapping point for the pressure transmitter, and design, supply and install: [ 2 ]  
- Pressure transmitter on the prepared tapping point  
- Tubing between tapping point and transmitter

■ : Differential pressure transmitters Q'ty

Design, supply and install:  
- Differential pressure transmitter on the existing spare tapping point  
- Tubing between tapping point and transmitter

Prepare the tapping point for the differential pressure transmitter, and design, supply and install: [ 4 ]  
- Differential pressure transmitter on the tapping point  
- Tubing between tapping point and transmitter

■ : Temprature transmitters Q'ty

Design, supply and install: [ 2 ]  
- Thermowell in the spare boss on the pipe  
- Resistance temperater detector complete with a head mounted transmitter into the thermowell

■ : Limit switch Q'ty

Design, supply and install the limit switch on the existing shutdown valve for valve position monitoring.

Pick up Signal from the Existing Turbine Meter Q'ty  
Supply and install a dual pulse output pickup head in place of the single pulse output pickup in the existing turbine flowmeter sensor head. The output signal from the existing turbine flowmeter to be cabled via junction box to RTU.

Local Field Instrument Junction Box Q'ty [ 1 ]  
Design, supply and install an Intrinsic safety junction box. The junction box to be suitable for glanding appropriate cables.

Instrument Cables  
Design, supply, install the instrument cables from the field instruments to RTU via junction box including each cable termination with gland.

## 2. Communication System

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### ■ : Slave Telemetry System

- Removal of existing slave telemetry equipment  
Remove and dispose the existing slave telemetry system including antenna and cable.
- Slave Telemetry Equipment  
Design, supply and install new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Slave Telemetry Equipment (design & supply only)  
Design and supply new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Existing monopole  
Re-use existing monopole to mount new antenna.
- New monopole  
Design, supply and install new monopole with foundation to mount new antenna.
- New monopole (design & supply only)  
Design and supply new monopole to mount new antenna.

## 3. Electrical Works

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### ■ : Power Supply to RTU

- Electrical power shall be supplied to RTU from existing PDB, and existing power cable shall be re-used.
- Design, supply and install MCB box for the power supply to RTU including all cables from existing PDB to MCB box and from MCB box to RTU.
- Design, supply and install power controller and power cable to RTU at remote site where electrical power is supplied from existing solar panel.
- Design, supply and install new solar panel, power controller and power cable to RTU.

## 4. Civil Works

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### ■ : Foundation & Sunshade for RTU

- Re-use existing foundation & sunshade for RTU  
Examine the condition of existing foundation and sunshade for RTU and repair the defects, if any.
- Provide new foundation & sunshade for RTU  
Design and construct the foundation and sunshade for new RTU at suitable location. The foundation and sunshade should be designed to suitably accommodate new RTU.

### ■ : Instrument Stand with Foundation & Sunshade

- Re-use existing Instrument stand(s) with foundation & sunshade  
Examine the condition of existing Instrument stand(s) with foundation & sunshade and repair the defects, if any.
- Provide new Instrument stand(s) with foundation & sunshade  
Design and construct the Instrument stand(s) with foundation & sunshade at suitable location. It should be designed to suitably accommodate the required number of instruments and explosion proof instrument field junction box.

## 5. Site Photo

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Whole view of site



Site view

## 6. Site Layout

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Site layout shall be provided later.

# Site Information & Scope of Work

## Site Information

Site Name : Jalalabad Head Office  
Site Code : 10-JAL-600M/600T

Site Address : To be provided later.

Coordinates : N 24° 53' 00.8 " : E 91° 53' 04.9 "  
*\* Coordinates are surveyed by handy type GPS and might be inaccurate.*

- Site Type
- |   |  |
|---|--|
| <input type="checkbox"/> Control Center         | <input checked="" type="checkbox"/> Master Telemetry Station         |
| <input type="checkbox"/> Gas Field              | <input checked="" type="checkbox"/> Operating Company Terminal (OCT) |
| <input type="checkbox"/> CGS (City Gas Station) | <input type="checkbox"/> Power station/Fertilizer Factory            |
| <input type="checkbox"/> Compressor Station     | <input type="checkbox"/> TBS (Town Bordering Station)                |
| <input type="checkbox"/> Pig Station            | <input type="checkbox"/> DRS (District Regulating Station)           |
| <input type="checkbox"/> MS (Metering Station)  | <input type="checkbox"/> GMS (Gas Manifold Station)                  |
| <input type="checkbox"/> VS (Valve Station)     |  |

- Site Status
- Originally covered by The Existing System and shall be covered by The New System.
  - Currently not covered by The Existing System but shall be covered by The New System.
  - Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : JGTDSL

Remarks : \_\_\_\_\_  
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## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

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- : OCT (Operating Company Terminal)
  - Design, supply and install a HMI, a color printer and UPS as minimum configuration to monitor the operating condition of GTCL pipeline.

## 2. Communication System

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### ■ : Master Telemetry Station (Former Microwave Radio Station)

- Removal of existing communication system  
Remove and dispose following existing items used for microwave transmission system:
  - Microwave equipment/facilities in the radio equipment room
  - Antenna mounted on the existing tower
  - Cables between radio equipment room and existing tower
  
- Radio equipment to connect Master Telemetry Station with Provider's Access Point  
Design, supply and install IP radio equipment at existing radio equipment room to connect Master Telemetry Station with nearest Provider's Access Point (BTCL's AP), including all necessary cables, accessories and the antenna to be mounted on the existing tower.
  
- Master telemetry equipment  
Design, supply and install master telemetry equipment at existing radio equipment room to connect with slave telemetry equipment, including all necessary cables, accessories and the antenna to be mounted on the existing tower.
  
- Radio equipment to connect Master Telemetry Station with OCT  
Design, supply and install IP radio equipment at radio equipment room to connect Master Telemetry Station with Operating Company Terminal (OCT) at another site, including all necessary cables, accessories and the antenna to be mounted on the existing tower.
  
- Radio equipment to connect Provider's Access Point with Master Telemetry Station  
Design, supply and install IP radio equipment at nearest BTCL's access point to connect BTCL's AP with Master Telemetry Station, including all necessary cables, accessories and the antenna with monopole.
  
- Network equipment  
Design, supply and install all necessary Network equipment at radio equipment room of Master telemetry station as well as at nearest BTCL's access point.
  
- Network cable to OCT  
Design, supply and install network cable between Master Telemetry Station and OCT which shall be installed within the same site.

### ■ : IP PBX System

- IP PBX main unit  
Design, supply and install IP PBX main unit with necessary accessories and spare parts.
  
- Extension telephone set Q'ty  
Design, supply and install extension telephone set(s) with required cables. [ 1 ]

## 3. Electrical Works

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### ■ : Backup Batteries for Radio Equipment at Master Station

- Remove and dispose existing backup batteries for radio equipment.  
Supply & install new backup batteries with charger suitable to backup new radio equipment for 48 hours.

## 4. Civil Works

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### ■ : Refurbishment of Existing Radio Building/Radio Equipment Room

- Refurbishment of Radio Building  
Examin the condition of the whole existing radio building and repair the defects if any.  
Clean and touch-up the external and internal finish of the whole existing radio building.
  
- Refurbishment of Radio Equipment Room  
Examine the condition of existing rooms where radio equipment and backup batteries are installed and repair the defects if any.  
Clean and touch-up the internal finish of the said rooms.
  
- Cleaning of Radio Equipment Room  
Clean and tidy up the existing rooms where radio equipment and backup batteries are installed.



## 5. Site Photo

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Existing Radio Equipment Room located at penthouse of commercial b

## 6. Site Layout

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Site Layout Plan is not available.  
Radio equipment room is located in the penthouse of commercial building at Sylhet Town.

# Site Information & Scope of Work

## Site Information

Site Name : Devpur DRS  
Site Code : 10-JAL-601

Site Address : To be provided later.

Coordinates : N 24° 54' 13.8 " : E 91° 55' 15.7 "  
\* Coordinates are surveyed by handy type GPS and might be inaccurate.

Site Type

<input type="checkbox"/> Control Center	<input type="checkbox"/> Master Telemetry Station
<input type="checkbox"/> Gas Field	<input type="checkbox"/> Operating Company Terminal (OCT)
<input type="checkbox"/> CGS (City Gas Station)	<input type="checkbox"/> Power station/Fertilizer Factory
<input type="checkbox"/> Compressor Station	<input type="checkbox"/> TBS (Town Bordering Station)
<input type="checkbox"/> Pig Station	<input checked="" type="checkbox"/> DRS (District Regulating Station)
<input type="checkbox"/> MS (Metering Station)	<input type="checkbox"/> GMS (Gas Manifold Station)
<input type="checkbox"/> VS (Valve Station)	

Site Status

- Originally covered by The Existing System and shall be covered by The New System.
- Currently not covered by The Existing System but shall be covered by The New System.
- Upcoming site which will be covered by The New System after the completion of the Project.

Operating Company : JGTDSL

Remarks : \_\_\_\_\_  
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## Scope of Work

Works checked off hereinafter shall be carried out for the Project

### 1. SCADA System

---

- : RTU
  - RTU without display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU with display monitor  
Design, supply and install a self-standing IP65 enclosure equipped with following items:
    - RTU
    - Display monitor
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - RTU (design & supply only)  
Design and supply self-standing IP65 enclosure equipped with following items:
    - RTU
    - Instrumentation and communication equipment
    - Backup battery system with charger for 24 hours
    - Lighting
    - Anti-condensation heater
    - Earthing and lightning protection
    - All internal wiring
    - Other equipment to satisfy the functional requirements
  - Interface with flow computer  
Make provision for:
    - Installation of the flow computer which shall be prepared by GTCL in the enclosure
    - Interface between RTU and the said flow computer
  - Interface with receiver for turbine meter  
Install the existing receiver for turbine meter(s) in the RTU enclosure and interface it (them) via communication (MODBUS) cable.

- Interface with other system  
Provide the interface between RTU and other system such as PLC or PC operated by the operating company including all communication cables between RTU and other system.

- Cable between RTU and Master Telemetry Station  
Design, supply and install the cable between RTU and Master Telemetry Station in case RTU and Master Telemetry Station are located in the same site.

■ : Instruments

- Existing instruments  
Re-use the existing instruments and cables.

*Note:*

*Existing instruments and cables shall be serviced by the Employer.*

- New Instruments  
Design, supply and install the following instruments.  
Output signals from instruments are to be cabled via field junction box to the RTU.

■ : Pressure transmitters Q'ty

- Design, supply and intall:
  - Pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the pressure transmitter, and design, supply and install:
  - Pressure transmitter on the prepared tapping point
  - Tubing between tapping point and transmitter[ 2 ]

■ : Differential pressure transmitters Q'ty

- Design, supply and install:
  - Differential pressure transmitter on the existing spare tapping point
  - Tubing between tapping point and transmitter
- Prepare the tapping point for the differential pressure transmitter, and design, supply and install:
  - Differential pressure transmitter on the tapping point
  - Tubing between tapping point and transmitter[ 4 ]

■ : Temprature transmitters Q'ty

- Design, supply and install:
  - Thermowell in the spare boss on the pipe
  - Resistance temperater detector complete with a head mounted transmitter into the thermowell[ 2 ]

■ : Limit switch Q'ty

- Design, supply and install the limit switch on the existing shutdown valve for valve position monitoring.

- Pick up Signal from the Existing Turbine Meter Q'ty  
Supply and install a dual pulse output pickup head in place of the single pulse output pickup in the existing turbine flowmeter sensor head. The output signal from the existing turbine flowmeter to be cabled via junction box to RTU.

- Local Field Instrument Junction Box Q'ty [ 1 ]  
Design, supply and install an Intrinsic safety junction box. The junction box to be suitable for glanding appropriate cables.

- Instrument Cables  
Design, supply, install the instrument cables from the field instruments to RTU via junction box including each cable termination with gland.

## 2. Communication System

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### ■ : Slave Telemetry System

- Removal of existing slave telemetry equipment  
Remove and dispose the existing slave telemetry system including antenna and cable.
- Slave Telemetry Equipment  
Design, supply and install new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Slave Telemetry Equipment (design & supply only)  
Design and supply new slave telemetry equipment in the RTU enclosure, including cables and antenna.
- Existing monopole  
Re-use existing monopole to mount new antenna.
- New monopole  
Design, supply and install new monopole with foundation to mount new antenna.
- New monopole (design & supply only)  
Design and supply new monopole to mount new antenna.

## 3. Electrical Works

---

### ■ : Power Supply to RTU

- Electrical power shall be supplied to RTU from existing PDB, and existing power cable shall be re-used.
- Design, supply and install MCB box for the power supply to RTU including all cables from existing PDB to MCB box and from MCB box to RTU.
- Design, supply and install power controller and power cable to RTU at remote site where electrical power is supplied from existing solar panel.
- Design, supply and install new solar panel, power controller and power cable to RTU.

## 4. Civil Works

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### ■ : Foundation & Sunshade for RTU

- Re-use existing foundation & sunshade for RTU  
Examine the condition of existing foundation and sunshade for RTU and repair the defects, if any.
- Provide new foundation & sunshade for RTU  
Design and construct the foundation and sunshade for new RTU at suitable location. The foundation and sunshade should be designed to suitably accommodate new RTU.

### ■ : Instrument Stand with Foundation & Sunshade

- Re-use existing Instrument stand(s) with foundation & sunshade  
Examine the condition of existing Instrument stand(s) with foundation & sunshade and repair the defects, if any.
- Provide new Instrument stand(s) with foundation & sunshade  
Design and construct the Instrument stand(s) with foundation & sunshade at suitable location. It should be designed to suitably accommodate the required number of instruments and explosion proof instrument field junction box.

## 5. Site Photo

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Whole view of site



Site view

## 6. Site Layout

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Site layout shall be provided later.