

Hydrographic Gauging Station Scoping Document

A Gauging Station is surface water monitoring infrastructure located on or near a stream, lake or canal where hydrologic data is collected.

The site selection process for a Gauging Station is critical with many criteria to be considered to ensure accuracy and dependability of data capture. Professional advice when choosing a site location is recommended.

Automated river height measurement can be achieved by the use of a variety of technology. The simplest installation could consist of a submersible pressure sensor with in-built data logger and fixed life power supply (photos 1 and 2), to a more robust installation allowing multiple parameter measurements complete with telemetry capability (photos 3 and 4).



Photo 1

Submersible pressure sensor with in-built data logger and fixed life power supply

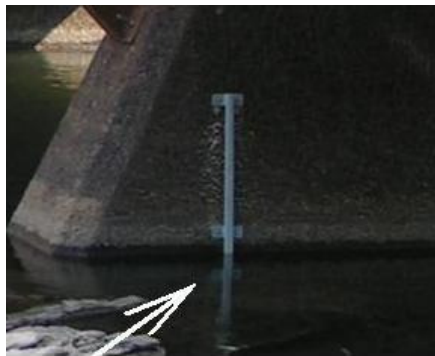


Photo 2



Photo 3

Robust installation allowing multiple parameter measurements complete with telemetry capability



Photo 4

The standard installation for NRETAS would consist of the following:-

- Instrumentation shelter (mounted on a stand if in a likely flood inundation zone).
- Instrumentation for the measurement of:
 - River height
 - Rainfall
 - Water quality (where required)
- Back filled trench that houses an instrumentation cable / tubing protected inside a galvanised steel conduit connecting the river to the instrumentation shelter.
- The data collected at site maybe relayed back to a remote office via telemetry. (Landline, GPRS (GSM / NextG) modem, radio or satellite phone modem).

Whilst components for gauging stations are specialised there are suppliers available throughout Australia and the Northern Territory.

The following brief indicates generic factors to consider when building a typical Gauging Station however the details should not be considered as all encompassing, individual site requirements usually involve some degree of customisation.

Hydrographic Gauging Station

Project Brief

Location: Site Name / River

Project Description: Example: Construction of Gauging Station

Timing:

Brief Issued: _____

Completion Date: _____

Funding / Budget: _____

Project Manager:

Name: _____

Phone: _____

Mobile: _____

Email: _____

1. Client Information

- Organisation wanting to build the Gauging Station

2. Purpose

- Why is the Site being built?
- Who will use the Site?
- What will the Site measure?
- Range, accuracy and frequency of data measurement required.
- Frequency of data transmission (If on telemetry)

2. Site Location

- Land Portion No
- GPS coordinates
- Land owners and property name
- Installation Positioning
- Hydrologic considerations
- Wet and dry season access
- How representative will the data be of the parameter measured
- Max Flood level for instrumentation protection

4. Instrumentation requirements

- Data Logger
 - Memory requirements
 - Infrastructure requirements
 - Features / algorithms required
- Telemetry system (Could consist of :-)
 - Land line
 - Mobile
 - Satellite modem
 - Radio modem
- Sensors
 - Rain Gauge

- Water quality
 - Turbidity
 - Temperature
 - Conductivity
 - Dissolved oxygen
- Stage Range
- Accuracy
- Distance from sensor / measuring point to logger
- Power Supply
 - Power requirements of dependant devices
 - Battery type and capacity
 - Solar panel capacity and orientation
- Instrumentation Shelter
 - Instrumentation to be housed
 - Durability and Shelter Security
 - Temperature / Humidity (Impact on instrumentation)

5. Infrastructure requirements:

- Fabricate structure/platform above maximum flood height. *(See photo 5 below)*



*Photo 5
Instrumentation shelter and platform*

- Instrumentation shelter to be fixed to platform. *(See Photo 5 above)*
- Rain gauge mounted on gal pipe which can be part of the platform/structure or concreted in ground away from structure taking into consideration of trees etc so not to impact on accurate data collection. *(See photo 6 below)*



Photo 6
Rain Gauge mounted on Gal Pipe

- A back filled trench approx 450mm deep that will house a galvanised pipe from lower bank to the instrumentation shelter located on upper bank. This pipe connects the river to the instrumentation in the instrument shelter and protects the instrumentation cable from bush fire. Single or dual lines may be required depending on installation requirements. (See diagrams 3 & 4 and Photo 7 below)

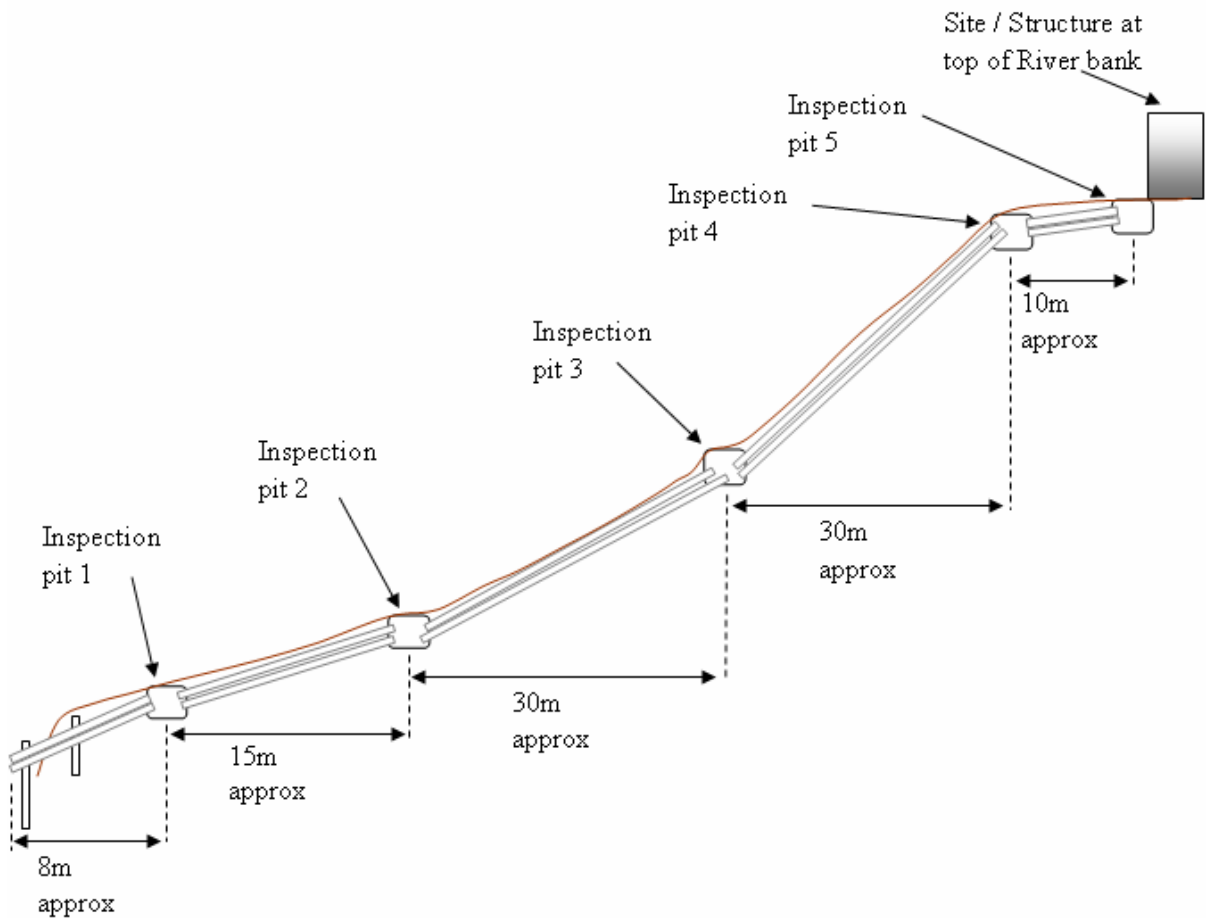


Diagram 3
Example of Cross Section View of Dual Orifice Line with Inspection pits

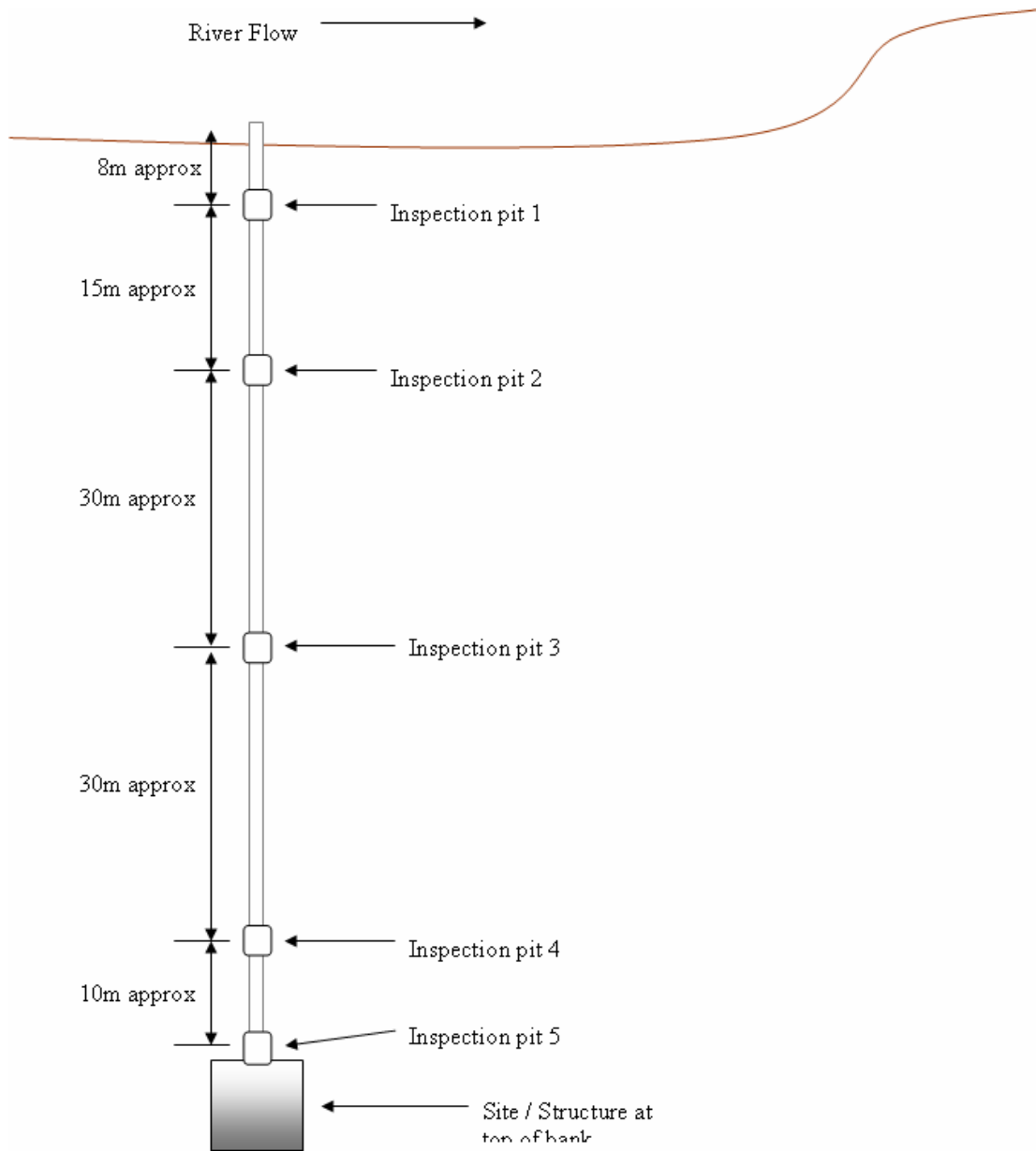


Diagram 4
Aerial view of Orifice Line with Inspection pits



Photo 7
Example of Orifice line / Gal Pipe

- The lower end of the pipe should have some sort of support to eliminate any movement from river flows and debris. (See diagram 5 and photo 8 & 9 below)

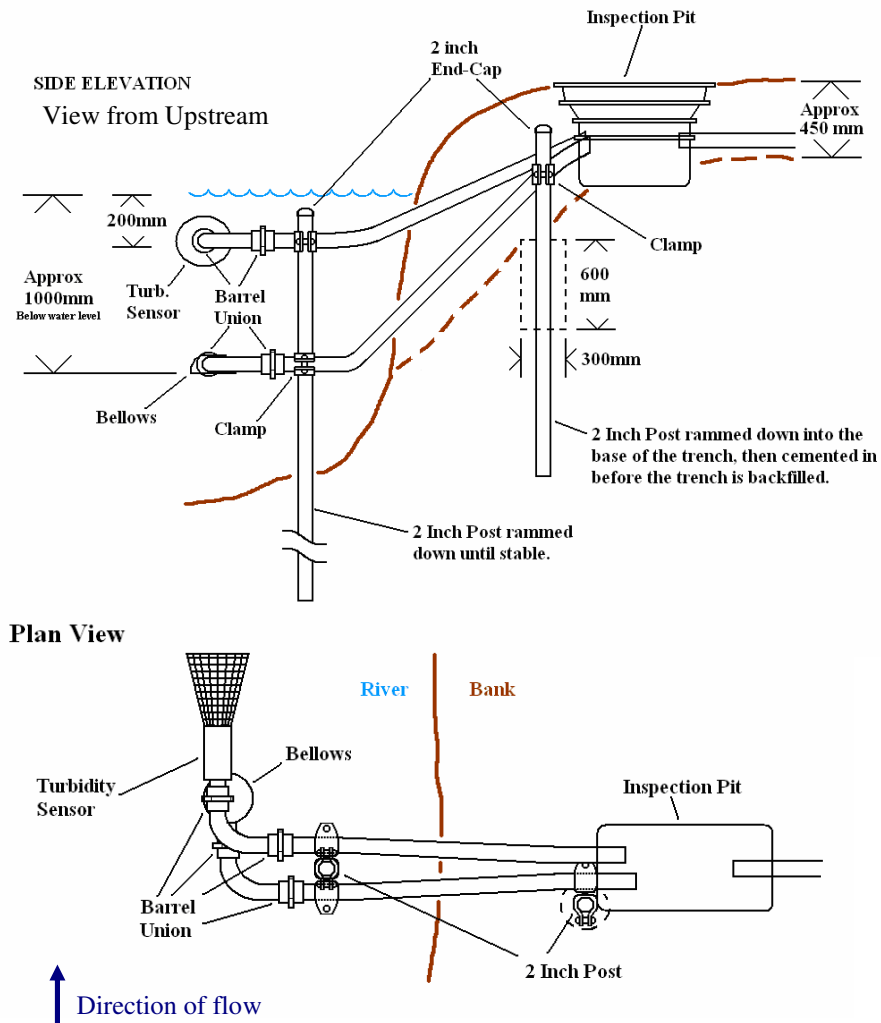


Diagram 5
Example of galvanised pipe support for Orifice and Turbidity Sensor end arrangements

- Inspection pits where possible should be used to facilitate access to cabling /orifice line. (See photo 8 below).



Photo 8
Inspection Pit



Photo 9
Example of Orifice and Turbidity
Sensor end arrangements



Photo 10
Butressed Staff Gauges

- Gauge boards to be installed to allow manual readings of the water level to validate the instrumentation data. (See diagram 6 and Photo 10)

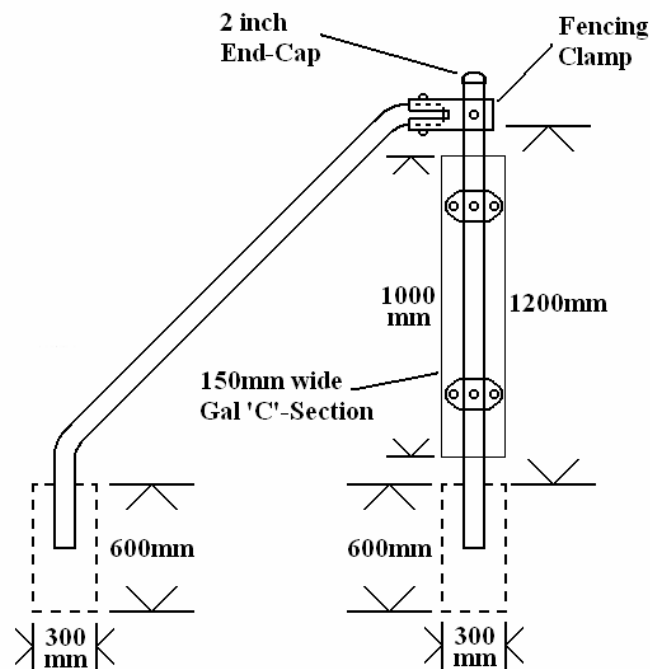


Diagram 6
Gauge post & C purlin with C10 fixing brackets

- Survey Bench Marks to be installed at the top and bottom of river bank for site referencing. (See photo 11 and 12)



*Photo 11
Example of Bench Mark on bridge abutment*



*Photo 12
Example of Bench Mark on bridge abutment*

6. Suppliers of Hydrological Instrumentation (list is not exhaustive)

- Hydrological Services Pty Ltd: <http://www.hydroserv.com.au/>
- Aqualab Scientific: <http://www.aqualab.com.au/>
- OTT: http://www.ott-hydrometry.de/web/ott_de.nsf/id/pa_home_e.html
- Davidson: <http://www.davidson.com.au/>
- Territory Instruments: <http://www.territoryinstruments.com/>
- Vaisala: <http://www.vaisala.com/>

Hydrographic Consultants (list is not exhaustive)

- Ecowise: <http://www.ecowise.com.au/default.aspx>
- A. D. Envirotech Australia Pty. Ltd: <http://www.adenviro.com.au/>
- Tyco Greenspan: <http://www.greenspan.com.au/>
- Novolta: <http://www.novolta.com.au/>
- MEA: <http://www.mea.com.au/>
- Hydro Tasmania: <http://www.hydrotasmaniaconsulting.com/files/00990-Hydro-Tasmania-Consulting.asp>

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Web www.nt.gov.au/nreta/naturalresources/water/surfacewater/telemeteredsites/index.shtml