



**Australian Government**

# **NWPHYD011 Measure and process low and medium flows using area velocity methods**

**Release: 1**

# NWPHYD011 Measure and process low and medium flows using area velocity methods

## Modification History

| Release | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | <p>This unit was released in NWP Water Training Package release 1.0 and meets the Standards for Training Packages.</p> <p>This unit supersedes and is equivalent to NWP340A Measure and process hydrometric stream discharge data using wading gaugings.</p> <ul style="list-style-type: none"> <li>• Unit code updated</li> <li>• Content and formatting updated to comply with the new standards</li> <li>• All PC transitioned from passive to active voice</li> <li>• Unit title changed to better reflect unit outcomes</li> <li>• Element 1 reworded</li> <li>• Two new PC added in Element 1</li> <li>• PC 1.2 and 2.4 revised</li> </ul> |

## Application

This unit of competency describes the skills required to collect stream discharge data using a range of current meters. An understanding of risk assessment and factors affecting the accuracy and precision of the area velocity method is essential to performance.

This unit applies to hydrographers employed by the water industry and to water operators involved in the monitoring of all the elements of the water cycle and their impact on the related environment.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures and relevant industry standards must be consulted and adhered to, particularly those relating to WHS, Bureau of Meteorology, World Meteorological Organisation and Australian Standards.

Those undertaking this unit would work in small teams, mostly under supervision, while performing complex tasks in a broad range of contexts that could be unpredictable, including remote, confined spaces, near water and/or at heights.

No licensing, legislative or certification requirements apply to unit at the time of publication.

## Competency Field

Hydrography

### Elements and Performance Criteria

| ELEMENTS                                                                          | PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Elements describe the essential outcomes                                          | Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section.                                                                                                                                                                                                                                                                                                                         |
| <b>1. Prepare to collect discharge data</b>                                       | 1.1 Identify the monitoring objective of the site and gauging requirements.<br>1.2 Identify, analyse and confirm the data collection method required by the organisation.<br>1.3 Select appropriate equipment and confirm site conditions are within instrument specifications.<br>1.4 Verify calibration and maintenance status.<br>1.5 Evaluate site conditions and prepare for taking measurements.<br>1.6 Identify possible influences on discharge measurement.<br>1.7 Select the cross-section for discharge measurement. |
| <b>2. Collect depth and velocity data</b>                                         | 2.1 Measure the width of the section.<br>2.2 Select appropriate sounding points (verticals) to subdivide the cross-section.<br>2.3 Measure the depth of vertical.<br>2.4 Select method to suit the ambient conditions and flow.<br>2.5 Collect velocity data at appropriate depth(s) for each vertical.                                                                                                                                                                                                                         |
| <b>3. Calculate discharge</b>                                                     | 3.1 Calculate the point velocity.<br>3.2 Calculate the mean velocity for each vertical.<br>3.3 Calculate the area of subsection corresponding to each vertical.<br>3.4 Calculate the discharge corresponding to each subsection.<br>3.5 Calculate the area and discharge at the section by summation of the subsection data.<br>3.6 Apply corrections for oblique flow as required.                                                                                                                                             |
| <b>4. Complete recording and reporting requirements for discharge measurement</b> | 4.1 Gather supporting information from the site and complete documentation.<br>4.2 Calculate and record the mean stage height and rate of change using relevant mathematical techniques.<br>4.3 Grade and record the gauging quality.<br>4.4 Check records.<br>4.5 Enter gauging into ratings database.                                                                                                                                                                                                                         |

## Foundation Skills

The foundation skills demands of this unit have been mapped for alignment with the Australian Core Skills Framework (ACSF). The following tables outline the performance levels indicated for successful attainment of the unit.

ACSF levels indicative of performance:

|          |   |   |   |   |         |   |   |   |   |         |   |   |   |   |                    |   |   |   |   |          |   |   |   |   |
|----------|---|---|---|---|---------|---|---|---|---|---------|---|---|---|---|--------------------|---|---|---|---|----------|---|---|---|---|
| 1        | 2 | 3 | 4 | 5 | 1       | 2 | 3 | 4 | 5 | 1       | 2 | 3 | 4 | 5 | 1                  | 2 | 3 | 4 | 5 | 1        | 2 | 3 | 4 | 5 |
| Learning |   |   |   |   | Reading |   |   |   |   | Writing |   |   |   |   | Oral communication |   |   |   |   | Numeracy |   |   |   |   |

Performance variables:

|         |   |   |   |   |         |   |   |   |   |                 |   |   |   |   |                 |   |   |   |   |
|---------|---|---|---|---|---------|---|---|---|---|-----------------|---|---|---|---|-----------------|---|---|---|---|
| 1       | 2 | 3 | 4 | 5 | 1       | 2 | 3 | 4 | 5 | 1               | 2 | 3 | 4 | 5 | 1               | 2 | 3 | 4 | 5 |
| Support |   |   |   |   | Context |   |   |   |   | Text complexity |   |   |   |   | Task complexity |   |   |   |   |

Further information on ACSF and the foundation skills underpinning this unit can be found in the Foundation Skills Guide on the GSA website.

## Range of Conditions

|                                |                                                                                                                                                                                                      |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Area velocity methods include: | <ul style="list-style-type: none"> <li>• Doppler velocity meter</li> <li>• acoustic Doppler current profiler</li> <li>• electromagnetic current meter</li> <li>• mechanical current meter</li> </ul> |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Unit Mapping Information

This unit supersedes and is equivalent to NWP340A Measure and process hydrometric stream discharge data using wading gaugings.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

# Assessment Requirements for NWPHYD011 Measure and process low and medium flows using area velocity methods

## Modification History

| Release | Comments                                                                                                                                                                                                                                                                                        |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | <p>These Assessment Requirements were released in NWP Water Training Package release 1.0 and meet the Standards for Training Packages.</p> <ul style="list-style-type: none"><li>• Assessment Requirements created drawing upon specified assessment information from superseded unit</li></ul> |

## Performance Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. The candidate must be assessed in at least one of the area velocity methods listed in the Range of Conditions. If not otherwise specified the candidate must demonstrate evidence of performance of the following on at least one occasion.

- assessing risks and taking appropriate precautions and/or actions
- maintaining testing equipment in good order and calibrating
- interpreting and applying technical documentation
- using surveying equipment to identify site location
- performing basic mathematical calculations using safety equipment and personal protective equipment
- identifying potential or actual operational problems
- communicating with employees and customers
- using computer and communication systems
- giving and receiving instructions
- collecting discharge data
- gathering, interpreting and applying complex documentation related to the specification of hydrographic data collection and reporting procedures
- collecting samples
- analysing and verifying data using standard procedures, software and databases
- preparing reports
- storing and archiving data
- identifying, reporting and solving potential or actual problems within scope of job function
- positioning equipment

## Knowledge Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the depth of knowledge demonstrated must be appropriate to the job context of the candidate.

- limitations of the system principle of areavelocity measurement of discharge
- turbulent and laminar flow
- equipment testing procedures
- WHS procedure
- characteristics of a suitable section for wading and boat gauging and how to make modifications

## Assessment Conditions

Competency should be assessed in an actual workplace or in a simulated environment, with access to equipment and infrastructure appropriate to the outcome. Competency should be demonstrated over time to ensure the candidate is assessed across a variety of situations.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>