1XXXXX Design irrigation pump systems

Kaupae | Level	5
Whiwhinga | Credit	20
Whāinga | Purpose	This skill standard is for people working in, or intending to gain skills in, selecting and evaluating pumps and motors for irrigation systems to ensure they are matched to operational demands, energy efficient, and compliant with relevant standards. People credited with this skill standard will be able to apply accurate hydraulic calculations, assess performance specifications, and implement risk mitigation strategies when selecting pump systems. This standard provides a foundation for further training in advanced irrigation system design, pump and motor optimisation, and energy-efficient irrigation management. This skill standard has been developed to align with the New Zealand Certificate in Irrigation System Design (Level 5).

Hua o te ako me Paearu aromatawai | Learning outcomes and assessment criteria

Hua o te ako | Learning outcomes	**Paearu aromatawai |** Assessment criteria
1. Evaluate system performance using curves, affinity laws, and energy use metrics.	a. Interpret pump performance curves to assess system efficiency and identify potential improvements.
	b. Apply affinity laws to predict performance changes resulting from modifications in system parameters.
	c. Analyse energy consumption metrics to evaluate operational efficiency.
2. Select pumps, motors, and components suited to design parameters and site conditions.	a. Select and document pumps, motors, and components that align with system demands and site-specific conditions.
	b. Justify component choices based on performance specifications and compatibility with the overall system design.
3. Identify risks to the pump system, develop and validate mitigations.	a. Identify risks to the pump related to hydraulic performance and site conditions
	b. Develop and document mitigations addressing identified risks to ensure system reliability and continuity.

Hua o te ako | Learning outcomes	**Paearu aromatawai |** Assessment criteria
	c. Validate all design choices comply with the New Zealand Piped Irrigation Systems Design Code of Practice and other relevant standards.

Pārongo aromatawai me te taumata paearu \| Assessment information and grade criteria

Assessment specifications:

Akōnga/learners must be collected from commercial irrigation systems, using naturally occurring evidence.

Activities can be assessed against existing, new or modified irrigation system – applicability.

The irrigation system is for an agricultural or horticultural property, sports turf surface, landscape, golf course, amenities and irrigated wastewater but are not limited to.

All activities and evidence must meet the requirements of worksite procedures, accepted industry practice and any subsequent amendments to legislation.

Evidence for all outcomes must be presented in accordance with; New Zealand Piped Irrigation Systems Design Code of Practice; and Irrigation; available from the Irrigation New Zealand website, http://irrigationnz.co.nz/ and any subsequent amendments.

Providers must give due consideration to embedding ngā kaupapa (principles) o Te Tiriti o Waitangi when designing delivery activities relevant to this standard. These principles are outlined in Guidelines for Providers: Embedding Tirohanga Māori.

Providers must give due consideration to the needs and values of Pacific peoples and other cultural groups when designing delivery activities relevant to this standard, ensuring practices are inclusive and equitable.

Definitions:

Accepted industry practice refers to approved codes of practice and standardised procedures accepted by the wider tree felling industries as examples of best practice.

Worksite procedures refer to documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to standard operating procedures, site safety procedures, equipment operating procedures, quality assurance procedures, housekeeping standards, procedures to comply with legislative and local body requirements.

Ngā momo whiwhinga \| *Grades available*

Achieved.

Ihirangi waitohu \| Indicative content

Select Appropriate Pumps and Components

- Pump Types: Choose between centrifugal, submersible, and turbine pumps based on water source and depth.
- Component Matching: Select filters, valves, and pressure regulators that align with system requirements.
- Efficiency Considerations: Prioritize components that enhance overall system efficiency and reliability.

Evaluate System Performance

- System Curves: Develop system resistance curves to understand pressure requirements at varying flow rates.
- Affinity Laws: Apply affinity laws to predict changes in pump performance with varying speed or impeller diameter.
- Energy Metrics: Monitor energy consumption and identify opportunities for efficiency improvements.

Identify Risks to the pumps and develop mitigations and compliance

- Risk Assessment: Identify potential system failures and their impact on operations.
- Contingency Strategies: Develop plans to mitigate identified risks and ensure system reliability.
- Maintenance Protocols: Establish regular maintenance schedules to prevent system failures.
- Code of Practice: Adhere to the NZ Piped Irrigation System Design Code of Practice for system design and performance.
- Regulatory Requirements: Comply with local regulations and consent conditions related to water use and system operation.

Rauemi | Resources

Legislation relevant to this skill standard includes but is not limited to:

- Irrigation New Zealand website (codes of practice), http://irrigationnz.co.nz/
- Health and Safety at Work Act 2015 Health and Safety at Work Act 2015 No 70 (as at 05 April 2025), Public Act Contents – New Zealand Legislation
- Resource Management Act 1991 Resource Management Act 1991 No 69 (as at 05 April 2025), Public Act Contents – New Zealand Legislation
- National Policy Statement for Freshwater Management 2014 National Policy Statement for Freshwater Management | Ministry for the Environment
- Public Works Act 1981 Public Works Act 1981 No 35 (as at 05 April 2025), Public Act Contents – New Zealand Legislation
- Resource Management (National Environmental Standards for Freshwater) Regulations 2020 Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (LI 2020/174) (as at 01 January 2025) Contents – New Zealand Legislation
- National Environmental Monitoring Standards (NEMS) National Environmental Monitoring Standards » National Environmental Monitoring Standards (NEMS)
- Site specific water resource consent or water supply agreement, weather data Home | NIWA
- Descriptions and soil profile data sheets S-Map Online | Manaaki Whenua - Landcare Research

and any subsequent amendments or replacements.

Pārongo Whakaū Kounga | Quality assurance information

Ngā rōpū whakatau-paerewa | Standard Setting Body	Muka Tangata – People Food and Fibre Workforce Development Council
Whakaritenga Rārangi Paetae Aromatawai | DASS classification	Engineering and Technology > Water Industry > Irrigation
Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga | CMR	0052

Hātepe | Process	**Putanga |** Version	**Rā whakaputa |** Review Date	**Rā whakamutunga mō te aromatawai |** Last date for assessment
Rēhitatanga | Registration	<type here>	[dd mm yyyy]	[dd mm yyyy]
Kōrero whakakapinga | Replacement information	This skill standard replaced Unit standard 28932.		
Rā arotake | Planned review date	31 December 2030		

Please contact Muka Tangata – People Food and Fibre Workforce Development Council at qualifications@mukatangata.nz to suggest changes to the content of this skill standard.