Title	**Assess the optimisation of a wastewater treatment plant, and describe critical control points**		
Level	**5**	**Credits**	**12**

Purpose	People credited with this unit standard are able to: assess the wastewater source for a wastewater treatment plant; demonstrate knowledge of the overall operation of a wastewater treatment plant; describe how the unit processes in the plant interact and how to optimise plant output; assess plant tuning in a wastewater treatment plant; describe emergency situations and process failure conditions in a wastewater treatment plant; and identify critical control points of wastewater treatment plant operation that may affect continuous operation, and identify adverse effects, preventative actions, and corrective actions.

Classification	Water Industry > Wastewater Treatment

Available grade	Achieved

Guidance Information

1 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable legislative and industry requirements. This unit standard must be assessed against evidence gathered on site. It is accepted that the range of inflow wastewater conditions set out in Outcomes 1 and 2 are unlikely to occur at the time of the assessment, which will thus need to be by way of explanation rather than actual demonstration.

2 Legislation relevant to this unit standard includes:
Health and Safety at Work Act 2015, Water Services Act 2021, Resource Management Act 1991, and subsequent amendments.

3 Definitions
Critical control point – specific point, procedure, or step in water treatment processes at which control can be exercised to reduce, eliminate, or prevent the possibility of a public health hazard.
Industry requirements include manufacturers' specifications; and enterprise requirements which may include documented workplace policies, procedures, specifications, business, and quality management requirements relevant to the workplace in which assessment is carried out.
On site – on the site of a full scale, operating wastewater treatment plant.
Wastewater may include stormwater and sewage systems.

4 Learning and assessment activities for this unit standard must be informed by Te Mana o te Wai (refer to Taumata Arowai) and the *National Policy Statement for Freshwater Management 2020* available from https://environment.govt.nz/.

Outcomes and performance criteria

Outcome 1

Assess the wastewater source for a wastewater treatment plant.

Performance criteria

1.1 The range in wastewater quality is described in terms of the effects of weather, reticulation system integrity, seasonal variations, and discharges.

Range industrial, domestic.

1.2 Treatment options appropriate to the characteristics of a given influent are assessed in terms of the impacts of quality and flow.

Range variations in amount and type of organic loading, temperature, pollutants, chemical composition.

1.3 The rate of change of key variables is described relative to the ability of the plant control system to adjust plant reactions.

Outcome 2

Demonstrate knowledge of the overall operation of a wastewater treatment plant.

Performance criteria

2.1 The water flow paths through a wastewater treatment plant and storage are physically identified.

2.2 The flow control elements are identified in terms of their functions.

Range control switches, level measurements, pump runs, pressure switches, valves, flow meters.

2.3 The individual plant process sections are identified and described in terms of their functions.

Range process objective, inflows, outflows, physical identification, wastewater quality changes.

2.4 Treated wastewater quality monitoring and plant automatic controls adjustment are described.

Range set points, ranges, instrument calibration, alarm points.

2.5 Manual control or intervention controls that are carried out are described.

Range alarm response, manual pump control, valve operation, sludge transfer, aeration;
evidence of two controls is required.

Outcome 3

Describe how the unit processes in the plant interact and how to optimise plant output.

Performance criteria

3.1 The relationship between pairs of unit processes and their interaction is described in terms of the total plant performance and how to optimise it.

Range sedimentation, flotation, activated sludge, fixed growth reactor, oxidation pond, lagoon, disinfection, screening or grit removal, receiving environment;
evidence of two processes is required.

Outcome 4

Assess plant tuning in a wastewater treatment plant.

Performance criteria

4.1 The plant flow rate is assessed in terms of wastewater quality variations.

Range influent quality changes, dosing limitations, required output, storage.

4.2 The plant physical and biological processes are assessed in terms of raw wastewater quality variations.

Range loading – organic, inorganic, chemical.

4.3 Adjustments of the plant mechanical processes are assessed in response to raw wastewater quality and flow variations.

Range mixing energies, sludge draw-off, flow balancing, flow diversion, mixing intensity.

Outcome 5

Describe emergency situations and process failure conditions in a wastewater treatment plant.

Performance criteria

5.1 Critical and emergency situations are identified and explained in terms of the impacts on processes and appropriate responses.

Range includes but is not limited to – floods, mechanical failure, pipeline failure, power supply losses, chemical handling and spills, earthquake awareness.

5.2 Responses to process failures are identified and described in accordance with the plant's contingency plans.

Outcome 6

Identify critical control points of wastewater treatment plant operation that may affect continuous operation, and identify adverse effects, preventative actions, and corrective actions.

Performance criteria

6.1 The critical control points in treatment plant operation that may affect continuous operation are identified.

6.2 The adverse effects, the causes of the events leading to their occurrence and the level of risk are identified at each critical control point.

6.3 The preventative and corrective actions for persistent problems or events related to each adverse effect are identified.

Planned review date	31 December 2026

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	19 April 2002	31 December 2018
Review	2	19 September 2008	31 December 2018
Review	3	16 March 2017	31 December 2023
Review	4	28 April 2022	N/A

Consent and Moderation Requirements (CMR) reference	0101

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@waihanga.nz if you wish to suggest changes to the content of this unit standard.