

FIELD PLANNING AND CONSTRUCTION**Review of *Surveying* unit standards**

Subfield	Domain	Id
Surveying	Geodetic Surveying	11131-11134
	Geographic Information Systems and Cartography	8975-8981, 16669
	Hydrography	11135-11151
	Subdivisional Design	11152, 11153
	Survey - Land Administration and Applied Resource Management	8772, 8773, 8779-8786
	Survey Practice	8762-8766, 8774-8778, 8798-8801
	Surveying - Photogrammetry and Remote Sensing	8787-8797, 8982-8985, 16668
	Titles and Survey Compliance	17220, 17223-17225, 19536-19539

InfraTrain New Zealand has completed the review of the unit standards listed above.

Date new versions published

February 2008

Planned review date

December 2012

Summary of review and consultation process

A scheduled review of unit standards in the subfield Surveying was carried out between July 2006 and March 2007. InfraTrain acknowledges the plentiful assistance given by the New Zealand Institute of Surveyors (NZIS) in this process, and in inviting interested industry parties including employers, trainees, assessors, and training providers to participate. Working groups were established for each domain and specialist advisors assisted where required for individual unit standards. Consultation occurred through working party meetings held in Auckland and Wellington, teleconferences, and email. The key provider, Unitech, was represented at most of the meetings and teleconferences. Land Information New Zealand was also represented and provided valuable feedback on compliance matters. For the Hydrography unit standards, advisors included the Royal New Zealand Navy and representatives of NZIS and the Australasian Hydrographic Surveyors Certification Panel.

The unit standards underwent thorough review to ensure they were fit for the current needs of the surveying industry, especially with respect to the training needs for the National Diploma in Surveying (Level 6) with an optional strand in Mine Surveying [Ref: 0453], which was being reviewed concurrently.

Following each meeting and teleconference, a summary of the agreed outcomes was circulated to all participants for further comment and verification. The final drafts were made available for comment on the NZIS website and feedback was also received from the School of Surveying, University of Otago, with a view to ensuring appropriate pathways lead to the surveying degree courses.

The Hydrography unit standards were reviewed to ensure they met the Royal New

Zealand Navy's urgent need for a qualification in hydrography at Level 3 or 4 and industry and navy requirements for a higher level qualification, aligned with the Fédération Internationale des Géomètres (FIG) and International Hydrographic Organization (IHO) accredited Category B (CAT B) qualification, and suitable as a pathway to university level study in hydrographic surveying.

Further consultation determined that unit standards in cartography, photogrammetry, remote sensing, and survey compliance are no longer relevant for the surveying industry, have not been used, or changes to legislation have made them redundant.

Main changes resulting from the review

This review reflects the legislative, structural, and technological changes affecting the surveying industry over recent years. All unit standards have had their legislation and references updated where necessary, special notes were standardised, definitions added, and outcomes amended to reflect current practice. Consistent assessment was assisted by the addition of precise criteria, and by clarifying the types and extent of evidence required.

- Geodetic Surveying unit standards 11131 and 11133 were replaced by unit standards 23859 and 23860, and 23861 and 23862 respectively.
- Geographic Information Systems and Cartography unit standards 8979, 8980, 8981, and 16669 were replaced by unit standards 23863 and 23864 respectively, and new unit standard 23865 was added to the domain. Unit standards 8975-8978 will expire as they are no longer fit for purpose.
- In the Hydrography domain, unit standard 11148 was replaced by unit standards 23868 and 23869 to separate industrial offshore surveying from coastal zone management, and new unit standards 23866 and 23867 were added to differentiate hydrographic surveying from land surveying competencies.
- In the Subdivisional Design domain new unit standard 23870 was developed to cover skills required to monitor the installation of a subdivision design;
- Survey Land Administration and Applied Resource Management unit standards 8773 and 8783 were replaced by unit standards 23871 and 23872 respectively, to contextualise them for surveying.
- Survey Practice unit standards 8765, 8774, 8775, 8776, and 8777 were replaced by unit standards 23874, 23875, 23876, 23877, and 23878 respectively; and new unit standards 23879, 23880, and 23881 were developed to fill gaps noted by industry.
- Generic unit standard 8762 would expire; the content did not clearly indicate what people are able to do. Assessing the reliability of marks for hydrographic surveying at Level 4 was now covered in unit standard 23866, and confirming the reliability of land survey marks was now covered at Level 6 in 23873.
- Unit standard 8763 would expire as it was no longer required by industry.
- Surveying - Photogrammetry and Remote Sensing domain unit standards 8787, 8788, 8982, and 16668 were amalgamated into new unit standard 23882 to avoid over assessment; and new unit standard 23883 was developed to meet industry requirements. Unit standards that 8789-8797 and 8983-8984 would expire because they had not been used and were no longer fit for purpose.
- Legislative changes made the unit standards in the Titles and Survey Compliance domain redundant, so they were expired. New unit standards 23884 and 23885 were developed to meet current surveying industry requirements.
- The credits of unit standards 8764, 8772, 8778, 8782, 8784, 8786, 11135, 11136, 11137, 11141, 11147, and 11149 increased to reflect additional competencies and accuracy requirements and to better reflect the time required to achieve competence.

- The credits of unit standards 11152 and 11153 decreased from 25 to 15 to better reflect the time required to achieve competence.
- The levels of unit standards 8782, 8784, and 11137 increased from 4 to 5; unit standard 11147 increased from 5 to 6; unit standards 11135, 11139, and 11151 increased from 3 to 4; unit standard 11136 increased from 3 to 5; and unit standard 8798 increased from 2 to 3; to better reflect the learning demand and processes carried out.
- The level of unit standard 8772 decreased from 6 to 5 to better reflect the learning demand.
- Titles of unit standards 8766, 8772, 8778, 8779, 8782, 8784, 8786, 8798, 11132, 11136, 11139, 11145, 11150, 11151, 11152, and 11153 were amended to match element statements, to contextualise, and to better reflect content.
- Guidance on target users was added to the purpose statements.
- Unit 8780, *Process resource consent application*, and Unit 8781, *Monitor a resource consent*, fell within the gazetted coverage of the Local Government Training Organisation (LGITO). They would expire because they were not appropriate for the surveying industry. LGITO was currently developing resource management unit standards and qualifications with its industry advisors.

Unit standards categorised as category C or D expire at the end of December 2009.

Impact on existing provider accreditations

Current Accreditation for			Accreditation extended to		
Nature of accreditation	Id	Level	Nature of accreditation	Id	Level
Standard	11131	5	Standard	23859, 23860	6
Standard	8979, 8980	5	Standard	23863	5

Impact on existing qualifications

Qualifications that contain the reviewed standards are tabled below.

Affected	The qualification lists a reviewed classification (domain or subfield) in an elective set The qualification lists a standard that has changes to level or credits The qualification lists a C or D category standard
Not materially affected	The qualification lists a standard that has a new title The qualification lists a standard that has a new classification

The following InfraTrain qualifications are impacted by the outcome of this review and are currently being reviewed. Items that generated the *Affected* status are shown in **bold**.

Qualification title	Classification or standard in the qualification
National Certificate in Surveying (Level 3) [Ref: 0432]	8762, 8763, 8764, 8774, 8775, 8776, 8777, 8778, 8784, 8798, 17220, 17223, 17224, 17225, 19536, 19537, 19538, 19539
National Certificate in Surveying (Geographic Information Systems) (Level 4) [Ref: 0996]	8782, 8783, 8784, 8788, 8789, 8790, 8791, 8792, 8793, 8794, 8795, 8796, 8797, 8799, 8981, 8982, 8975, 8976, 8977, 8978, 8979, 8981, 8982, 8983, 8984, 8985, 11132, 11137, 11147, 11148
National Certificate in Surveying (Hydrographic Surveying) (Level 5) [Ref: 0463]	8762, 8774, 8775, 8776, 8777, 8778, 8798, 8979, 8980, 11131, 11132, 11133, 11135, 11136, 11137, 11139, 11140, 11141, 11145, 11147, 11148, 11149, 11150, 11151, 19493

Qualification title	Classification or standard in the qualification
National Diploma in Surveying (Level 6) with an optional strand in Mine Surveying [Ref: 0453]	8762, 8763, 8764, 8765 , 8766, 8772, 8773, 8774, 8775, 8776, 8777 , 8778, 8779, 8780, 8781, 8782, 8783, 8784 , 8785, 8786, 8798, 11131, 11132, 11133, 11152, 11153

Review Categories and changes to classification, title, level and credits

All changes are in **bold**.

Key to review category	
A	Dates changed, but no other changes are made - the new version of the standard carries the same Id and a new version number
B	Changes made, but the overall outcome remains the same - the new version of the standard carries the same Id and a new version number
C	Major changes that necessitate the registration of a replacement standard with a new Id
D	Standard will expire and not be replaced

Subfield Surveying
Domain Geodetic Surveying

Id	Title	Level	Credit	Review Category
11131	Demonstrate knowledge of geodetic reference systems	5	4	C
23859	Demonstrate knowledge of geodetic reference systems and describe the New Zealand geodetic datums	6	4	
23860	Demonstrate knowledge of, and calculate on, map projections	6	4	
11132	Undertake geodetic computations Perform geodetic computations	6	5	B
11133	Undertake horizontal and vertical control surveys	5	4	C
23861	Explain height differences, and carry out a levelling survey, for geodetic surveying	6	4	
23862	Demonstrate knowledge of GNSS, and carry out a geodetic control network survey, for geodetic surveying	6	8	
11134	Undertake astronomical observations and computations	6	5	B

Domain Geographic Information Systems and Cartography

Id	Title	Level	Credit	Review Category
8975	Appraise and interpret a cartographic product	4	4	D
8976	Demonstrate knowledge of cartographic theory and principles	4	12	D
8977	Produce a map	4	30	D
8978	Demonstrate knowledge of printing and duplication processes used in cartography	3	8	D
8979	Demonstrate knowledge of spatial information systems	5	3	C
8980	Demonstrate knowledge of spatial data principles	5	6	C
23863	Demonstrate knowledge of spatial information systems	5	9	

Id	Title	Level	Credit	Review Category
8981	Capture spatial data	5	3	C
16669	Apply spatial data principles to capture surveying spatial data	6	12	C
23864	Demonstrate knowledge of data capture, and acquire and load data for a spatial information system	6	15	
23865	Present information from a spatial information system	6	8	NEW

Domain Hydrography

Id	Title	Level	Credit	Review Category
11135	Establish and monitor a tidal station	3 4	5 6	B
11136	Measure tidal streams Measure tidal streams and currents	3 5	4 6	B
11137	Process tidal data	4 5	5 6	B
11138	Determine survey vessel position	4	5	B
11139	Deploy and recover positional control systems Deploy a positional control system for hydrographic surveying	3 4	4	B
11140	Determine depth	5	8	B
11141	Conduct sidescan sonar operations	5	5 6	B
11142	Determine coastal topography	5	6	B
11143	Compile hydrographic survey records for presentation	4	15	B
11144	Demonstrate knowledge of oceanographic processes	5	5	B
11145	Demonstrate knowledge of marine safety issues for hydrographic surveying Demonstrate knowledge of maritime safety for hydrographic surveying operations	3	5	B
11146	Demonstrate knowledge of legal aspects of hydrography	5	5	B
11147	Demonstrate knowledge of hydrographic survey planning	5 6	5 8	B
11148	Demonstrate knowledge of industrial offshore and coastal zone management surveys	5	8	C
23868	Demonstrate knowledge of industrial offshore surveys	6	8	
23869	Demonstrate knowledge of hydrographic surveying in support of coastal zone management	6	8	
11149	Carry out nautical charting surveys	4 5	7 8	B

Id	Title	Level	Credit	Review Category
11150	Use hydrographic software for survey operations Use software for hydrographic survey operations	4 6	6	B
11151	Undertake the role of a survey motorboat coxswain Conduct sounding operations as a survey motorboat coxswain	3 4	5	B
23866	Locate existing survey marks, for hydrographic surveys, and assess their reliability	4	5	NEW
23867	Select site for new hydrographic survey marks, install survey marks, and complete site records for a hydrographic survey	3	3	NEW

Domain Subdivisional Design

Id	Title	Level	Credit	Review Category
11152	Assess site suitability and prepare conceptual plans for land subdivision Assess a site for subdivision and prepare the proposed subdivision plans and design report	6	25 15	B
11153	Design services for land subdivision Design infrastructure and services for subdivisions	6	25 15	B
23870	Establish quality requirements, manage, and monitor the installation of subdivision infrastructure	6	18	NEW

Domain Survey - Land Administration and Applied Resource Management

Id	Title	Level	Credit	Review Category
8772	Demonstrate knowledge of subdivision provisions of district plans Demonstrate knowledge of land administration requirements for subdivisions	6 5	4 6	B
8773 23871	Prepare a resource consent application Prepare and present a resource consent application in a surveying context	6 6	5 5	C
8779	Implement a resource consent Implement a resource consent in a surveying context	6	3	B
8780	Process resource consent application	6	5	D
8781	Monitor a resource consent	5	2	D
8782	Demonstrate knowledge of New Zealand land legislation and land development in relation to survey practice Demonstrate knowledge of land legislation and land development in New Zealand in a surveying context	4 5	4 12	B

Id	Title	Level	Credit	Review Category
8783	Identify local government organisation and development in relation to the survey industry	4	1	C
23872	Describe land administration in relation to land development and surveying	4	6	
8784	Demonstrate knowledge of the New Zealand survey system	4	3	B
	Demonstrate knowledge of the New Zealand surveying system	5	6	
8785	Demonstrate knowledge of legislation as it relates to Māori land and survey practice	4	3	B
8786	Prepare an application for the Māori Land Court	5	3	B
	Describe Māori land judicial and administrative systems and prepare an application for a partition		6	

Domain Survey Practice

Id	Title	Level	Credit	Review Category
8762	Confirm reliability of existing survey marks	4	5	D
23866	<i>Locate existing survey marks, for hydrographic surveys, and assess their reliability</i>	4	5	
23873	<i>Confirm the reliability of existing land survey marks</i>	6	12	
8763	Advise local and public utility authorities on survey maintenance	4	2	D
8764	Produce a topographical survey plan	5	6 8	B
8765	Produce cadastral survey plans	5	15	C
23874	Produce survey data for a cadastral dataset	6	10	
8766	Set out building and construction control, and obtain local authority certification	5	6	B
	Survey and set out building and construction control			
8774	Set up survey instruments and targets	3	2	C
23875	Demonstrate knowledge of, and set up, survey instruments and targets	3	8	
8775	Undertake and record linear field measurements for survey purposes	3	3	C
23876	Demonstrate knowledge of, perform, and record, linear field measurements for survey practice	4	8	
8776	Undertake and record angular field measurements for survey purposes	3	4	C
23877	Explain, perform, and record, angular field measurements using standard surveying instruments	4	6	
8777	Determine vertical height for survey purposes	3	3	C
23878	Determine differences in height for survey practice	4	7	

Id	Title	Level	Credit	Review Category
8778	Construct control survey marks, bench marks and trigonometrical beacons Construct and maintain control survey marks on land	3	3 8	B
8798	Work safely during survey operations Work safely in a surveying workplace	2 3	6	B
8799	Calculate areas, contours, and volumes for survey purposes	3	8	B
8800	Apply mathematics to surveying	4	15	B
8801	Use contemporary software to carry out survey computations	4	6	B
23873	Confirm the reliability of existing land survey marks	6	12	NEW
23879	Demonstrate knowledge of safety for survey practice	2	6	NEW
23880	Explain, and use, the Global Positioning System for survey practice	4	10	NEW
23881	Demonstrate knowledge of legislation for survey practice	5	6	NEW

Domain Surveying - Photogrammetry and Remote Sensing

Id	Title	Level	Credit	Review Category
8787	Demonstrate knowledge of aerial photographs	3	2	C
8788	Demonstrate knowledge of photogrammetry in New Zealand	4	3	C
8982	Demonstrate knowledge of the physical processes of remote sensing systems	4	6	C
16668	Demonstrate knowledge of the principles of photogrammetry and remote sensing	6	14	C
23882	Demonstrate knowledge of the principles of remote data acquisition and its use in New Zealand	6	18	
8789	Plan and acquire survey photography	5	5	D
8790	Use graphical plotting techniques for photogrammetry	3	3	D
8791	Demonstrate knowledge of the basic principles and structures of stereo plotting systems	4	4	D
8792	Apply orientation processes to analogue, analytical and digital photogrammetric systems	4	6	D
8793	Capture photogrammetric data	4	10	D
8794	Produce rectified aerial photography	5	6	D
8795	Plan and acquire photo control	6	10	D
8796	Initiate and manage a photogrammetric project	6	3	D
8797	Calibrate and maintain analogue stereoplotters	5	8	D
8983	Enhance digital image for surveying purposes	5	6	D
8984	Register and rectify digital image for surveying purposes	5	6	D
8985	Classify digital image for surveying purposes	5	6	D

Id	Title	Level	Credit	Review Category
23883	Plan, process, and assess remote data in a surveying context	6	6	NEW

Domain Titles and Survey Compliance

Id	Title	Level	Credit	Review Category
17220	Re-issue a Certificate of Title	3	7	D
17223	Issue Certificates of Title	4	8	D
17224	Demonstrate knowledge and application of Cadastral Survey (Fees) Regulations 2003	3	5	D
17225	Demonstrate knowledge of Land Title and survey records	3	8	D
19536	Lodge and scan survey plans	3	5	D
19537	Capture survey plans	4	5	D
19538	Perform Quality Control Functions for Survey Data	5	3	D
19539	Perform topology and geometry survey data functions	5	6	D
23884	Demonstrate knowledge of, and extract, cadastral data from Landonline	3	5	NEW
23885	Create digital cadastral datasets for submission as e-surveys	5	12	NEW