



Treasury Board of Canada
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CLASSIFICATION STANDARD

**ENGINEERING AND LAND SURVEY
SUB-GROUP LAND SURVEY**

SCIENTIFIC AND PROFESSIONAL CATEGORY

CLASSIFICATION STANDARD

ENGINEERING AND LAND SURVEY Sub-Group Land Survey

SCIENTIFIC AND PROFESSIONAL CATEGORY

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INTRODUCTION

The classification standard for the Survey Sub-group employs the point-rating method of classification to evaluate jobs, with the exception of the level "Surveyor 1" for which a narrative description is provided. The plan consists of an introduction, category, group and sub-group definitions, a narrative description for level one, rating scales, a bench-mark position description index and bench-mark position descriptions.

Point rating is an analytical, quantitative method of determining the relative values of jobs. Point-rating plans define characteristics or factors common to the jobs being evaluated, define degrees of each factor and allocate point values to each degree. The total value determined for each job is the sum of the point values assigned by the raters.

All methods of job evaluation require the exercise of judgment and the orderly collection and analysis of information in order that consistent judgments can be made. The point-rating method facilitates rational discussion and resolution of differences in determining the relative values of jobs.

Factors

The combined factors may not describe all aspects of jobs. They deal only with those characteristics that can be defined and distinguished and that are useful in determining the relative worth of jobs. Four factors are used in this plan. They are Knowledge, Decision Making, Responsibility for Contacts and Supervision.

Factor Weighting and Point Distribution

The weighting of each factor reflects its relative importance. Similarly, points are distributed to the factors or elements in an arithmetic progression.

Rating Scale

In the rating plan the following factors, factor weight and point values are used:

	Factors	Factor Weights	Point Values	
			Minimum	Maximum
1)	Knowledge	39%	100	385
2)	Decision Making	30%	100	299
3)	Responsibility for Contacts	17%	43	170
4)	Supervision	14%	21	137

Bench-mark Positions

Bench-mark position descriptions are used to exemplify degrees of factors. Each description consists of a list of principle duties and specifications describing the degree of each factor against which the position is rated. The bench-mark positions have been evaluated and the degree and point values assigned for each factor are shown in the specifications.

The rating scales identify the bench-mark position descriptions that exemplify each degree. These descriptions are an integral part of the point-rating plan and are used to ensure consistency in applying the rating scales.

Use of the Standard

There are six steps in the application of this classification standard.

1. The position description is studied to ensure understanding of the position as a whole. The relation of the position being rated to positions above and below it in the organization is also studied.
2. Allocation of the position to the category, group and sub-group is confirmed by reference to the definitions and the descriptions of inclusions and exclusions.
3. Tentative degrees of each factor in the position being rated are determined by comparison with degree definitions in the rating scales. Uniform application of degree definitions requires frequent reference to the description of factors and the notes to raters.
4. The description of the factor in each of the bench-mark positions exemplifying the degree tentatively established is compared with the description of the factor in the position being rated. Comparisons are also made with descriptions of the factor in bench-mark positions for the degrees above and below the one tentatively established.
5. The point values for all factors are added to determine the tentative total point rating.
6. The position being rated is compared as a whole with positions to which similar total point values have been assigned, as a check on the validity of the total rating.

Determination of Levels

The ultimate objective of job evaluation is the determination of the relative values of jobs in each occupational group. Jobs that fall within a designated range of point values will be regarded as of equal difficulty and will be assigned to the same level.

CATEGORY DEFINITION

Occupational categories were repealed by the Public Service Reform Act (PSRA), effective April 1, 1993. Therefore, the occupational category definitions have been deleted from the classification standards.

GROUP DEFINITION

For occupational group allocation, it is recommended that you use the [Occupational Group Definition Maps](#), which provide the 2005 group definition and their corresponding inclusion and exclusion statements. The maps explicitly link the relevant parts of the overall 2005 occupational group definition to each classification standard.

NARRATIVE DESCRIPTION

LEVEL - SUR 1

Under the supervision of a more senior employee such as a survey party chief, performs a variety of tasks selected to develop knowledge and skills in the practice of surveying or in the development or analysis of survey systems. The work includes setting up and reading survey instruments, selecting survey station sites, making computations, serving as an assistant to the chief of a survey party and serving as the chief of a survey sub-party. The work may also include searching registered plans and related documents to obtain information required in conducting surveys. For some positions the work includes assignments related to the development or analysis of survey systems, or studying photogrammetry or geodesy, as well as other assignments selected to develop a capacity to undertake complete projects primarily concerned with surveying, mapping or charting.

POINT-RATING EVALUATION PLAN ENGINEERING AND LAND SURVEY GROUP

SURVEY SUB-GROUP

(LEVELS SUR 2 AND UP)

POINT BOUNDARIES ENGINEERING AND LAND SURVEY GROUP SURVEY SUB-GROUP

up to 350	EN-SUR-2
351 - 495	EN-SUR-3
496 - 640	EN-SUR-4
641 - 860	EN-SUR-5
861 up	EN-SUR-6*

* Where tentative ratings are 861 points or greater, the position should be considered for testing against the Senior Management Group of the Senior Management Category.

KNOWLEDGE

This factor is used to measure the difficulty of the work in terms of the skill and knowledge needed to perform the duties of the position.

Definitions

"Skill" refers to the ability required to perform such tasks as planning and conducting specific surveys, calibrating and operating instruments capable of fine measurements, making calculations, locating and identifying data and evaluating scientific and technical information, and planning, organizing, coordinating and controlling activities.

"Knowledge" refers to the understanding required of such matters as laws concerning ownership of land, scientific theories and principles and their applications, computer technology, developments in related fields of work in universities and in other countries, scientific technical methods and practices associated with the work, and the administrative practices and procedures used in the federal public service.

Notes to Raters

The six degrees of the Knowledge factor assigned to bench-mark positions have been established by comparative ranking. In applying the standard the degree of the factor tentatively selected is to be confirmed by comparing the duties of the position being rated with the duties and specifications of bench-mark positions.

RATING SCALE - KNOWLEDGE

Degree of Knowledge	Points	Bench-mark Position Descriptions		Page
		No.		
1	100	1	Surveyor	1.1
2	157	2	Senior Geodetic Surveyor	2.1
3	214	3 4	Research Officer Head, Inertial Surveys Sub-section	3.1 4.1
4	271	6	Regional Surveyor	6.1
5	328	5	Chief, Data Analysis and Adjustments Section	5.1
6	385			

DECISION MAKING

This factor is used to measure the difficulty and importance of the work. The two elements of the factor are the scope for the exercise of initiative and judgment and the impact of decisions.

Definitions

"Decisions" refers to decisions to take particular courses of action within the authority delegated to the position, to recommendations to superiors and to line officers to follow particular courses of action, and to shared decisions and recommendations in which the incumbent is an effective participant.

"Scope for the exercise of initiative and judgment" refers to the freedom to take particular courses of action. It is measured in terms of the requirement to make decisions, recommendations and proposals within the framework of program objectives, the direction and guidance provided by seniors in the organization, established methods and procedures, and the difficulty of determining the implications of possible courses of action.

"Impact of decisions" refers to the importance of the decisions in terms of the resources of the organization that are committed or affected. It also refers to the importance of decisions in terms of their effect on the public, industry, other departments and agencies and levels of government, and to the significance of precedents established.

"Established methods" is to be interpreted broadly to include the guidance provided by manuals and directives, and by precedents.

"Program" refers to the plans of action that are developed and implemented by the organization to achieve its objectives.

"Activities" refers to major divisions of a program.

Notes to Raters

The three degrees of the Impact of Decisions element are illustrated by the bench-mark position descriptions. The following characteristics of the work are to be considered in determining a tentative degree for this element:

1. The size and nature of the internal resources committed or affected by program decisions.
2. The effect of the decision on the public, industry and other organizations.
3. The value and nature of the assets controlled or significantly affected.
4. The extent to which the incumbent is the effective recommending authority, which is usually related to the level of the position in the organization.
5. The consequences of an error of judgment in making a decision or recommendation.

In rating positions under the Impact of Decisions element, raters are to consider both the kind and the significance of the effect of action taken, the organization in which the position is located, and the result of an error that is possible and not an error that is only remotely possible or an error resulting from neglect or incompetence.

Any one characteristic is only an indication of the impact of the decisions, and the whole context within which the work is performed is to be considered. The job as a whole is then to be compared with the descriptions of the bench-mark positions exemplifying the degree of impact that has been tentatively established.

The degree of the Decision Making factor tentatively selected is to be confirmed by comparing the position being rated with the description of the duties and specifications of bench-mark positions.

RATING SCALE - DECISION MAKING

Scope for Exercise of Initiative and judgment, and degree

Degree of Impact of Decisions	<p>There is some scope for initiative, judgment, and discretion. Individual problems are solved by selection of a course of action indicated by established methods and instructions. The implications of possible courses of action are usually apparent from precedents. Unusual problems are referred to superiors.</p>	<p>There is scope for a moderate degree of initiative, judgment, and discretion. Problems are solved by selection of courses of action that may require modification of established methods. The implications of possible courses of action may not be readily apparent. Direction is sought when the apparent solutions to problems are not within the intent of established practices.</p>	<p>There is scope for a significant degree of initiative, judgment and discretion. Problems are solved by modification of established methods or by devising new courses of action within the intent of established activities. The implications of possible courses of action are often difficult to determine. Recommendations are made to effect changes in activities.</p>
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	A	B	C
	100/	165/	230/
	Surveyor	Page 1.2	Page 2.2
1		Senior Geodetic Surveyor Head, Inertial Surveys Sub-section Research Officer	4.2 3.1
	167/	232/	297/
2		Regional Surveyor Chief, Data Analysis and Adjustments Section	6.2 5.2
	234/	299/	
3			

RESPONSIBILITY FOR CONTACTS

This factor is used to measure the difficulty and importance of contacts that occur as an integral part of the work and the requirements imposed by these contacts to work and communicate with others in person, by telephone or in writing. The two elements of the factor are the purpose and nature of contacts and the persons contacted.

Definitions

"Associates" refers to persons with whom contacts are customarily established over long periods of time and in circumstances that develop an awareness of each other's requirements.

"Officials" refers to administrators or other persons with executive authority who are not associates. Notes

to Raters

Only those contacts that are an integral part of the work and that result from the duties assigned or sanctioned by management are to be considered.

An officer of a department, another level of government, private organization or industry may be an associate or an official, depending on the circumstances under which the contacts occur.

If the duties of the position include contacts described under more than one combination of purpose and nature of contacts and persons contacted, the points for each combination are to be determined and the highest point value used.

Points are to **be** assigned for written contacts only if the duties of the position being rated include responsibility for signing letters or memoranda.

RATING SCALE - RESPONSIBILITY FOR CONTACTS

Persons Contacted and Degree	purpose	and Nature of Contacts,		and Degree		
		A	B		C	
	To exchange information, provide technical advice and guidance, and obtain agreement on methods and procedures to be used complete assigned projects.		To resolve problems associated with planning, developing and implementing projects OR to persuade and obtain agreement on courses of action to overcome unresolved differences of view.	To act as a representative of the department or agency at formal meetings where differences in interest may be expected, with authority to discuss problems and seek common ground on which to base solutions.		
	43/	Page	86/	Page	130/	Page
1	Surveyor	1.2	Head, Inertial Surveys Sub-section Research Officer	4.2 3.2		
	63/		106/		150/	
2	Senior Geodetic Surveyor	2.2	Chief, Data Analysis and Adjustments Section Regional Surveyor	5.2 6.2		
	83/		126/		170/	
3						
Degree			Persons Contacted			
1			Such persons as associates in the Federal Public Service, other levels of government and non-governmental organizations; employees and proprietors of firms supplying goods and services; and members of the general public.			
2			Such persons as officials in the Federal Public Service, other levels of government and non-governmental organizations; and associates in other countries.			
3			Such persons as officials of other countries and of international organizations.			

SUPERVISION

This factor is used to measure the continuing responsibility that the incumbent of the position assumes for the work and guidance of other employees. The two elements of the factor are the number of employees supervised and the level of employees supervised.

Definitions

"Number of employees supervised" refers to the total number of employees for whom the incumbent of the position exercises supervisory responsibility.

"Level of employees supervised" refers to the highest level supervised.

Notes to Raters

A position whose incumbent does not have a continuing and substantive responsibility for the supervision of the work of others is not to be assigned points under this factor. Characteristically, "substantive responsibility" includes allocating staff to various work projects, proposing disciplinary action, *informing staff of their strengths and weaknesses, proposing changes in the numbers and classification of positions*, and ensuring that work standards are maintained.

Occasional supervision, such as that performed during absences of the supervisor on annual or sick leave, is not to be rated.

For the purpose of the standard, "number of employees supervised" includes the total of the following:

1. The number of employees in the department or agency for whom the incumbent has continuing and substantive supervisory responsibility directly or through subordinate supervisors.
2. The number of person-years of work performed by casual, part-time, seasonal and other employees who are supervised by the incumbent on field surveys and other projects.
3. The number of employees in the department or agency for whom the incumbent has responsibility for functional supervision.

The term "functional supervision" applies to staff of units for which the incumbent of the position being evaluated

1. has authority to prescribe objectives or programs and the methods and procedures to be followed in carrying out a specialized function,

and

2. has responsibility for ensuring adherence to established programs, methods and procedures,

and

3. has authority to make effective recommendations on employment, promotions or transfers.

In 3 above, the term "has authority" refers to established practices that require senior officials to exercise significant influence on the employment, promotion or transfer of employees who are not under their direct supervision. It does not imply, however, authority to impose their views on line officers.

Employees at all levels are to be included in the numbers subject to functional supervision, although the third criterion may not apply to those at junior levels to the same degree as to more senior employees.

RATING SCALE - SUPERVISION

Level of Employees supervised, and Degree	Number of Employees Supervised, and Degree			
	1-4 A	5-11 B	12-24 C	25-49 D
1	21	47	73	99
2	40	66	92	118
3	59	85	111	137

Level of Employees Supervised, and Degree	Bench-mark Position Descriptions	Page
Supervises employees in any group at levels equivalent to the lowest level in the Survey Sub-group	1	Surveyor Research Officer
		1.2 3.2
Supervises employees in any group at levels equivalent to the intermediate levels of the Survey Sub-group	2	Senior Geodetic Surveyor
		Chief, Data Analysis
		and Adjustments Section
		Regional Surveyor
		2.2 5.2 6.2
Supervises employees in any group at levels equivalent to the senior levels of the Survey Sub-group	3	Head, Inertial Surveys
		Sub-section
		4.2

BENCHMARK POSITION DESCRIPTION INDEX

In Ascending Order of Point Values

BENCH-MARK DESCRIPTIVE TITLE	POSITION NO.	TOTAL POINTS	PAGE
Surveyor	1	264	1.1
Senior Geodetic Surveyor	2	451	2.1
Research Officer	3	486	3.1
Head, Inertial Surveys Sub-section	4	531	4.1
Regional Surveyor	6	701	6.1
Chief, Data Analysis and Adjustments Section	5	758	5.1

BENCH-MARK DESCRIPTION INDEX In Alphabetical Order

BENCH-MARK POSITION NO.	DESCRIPTIVE TITLE	PAGE
5	Chief, Data Analysis and Adjustments Section	5.1
4	Head, Inertial Surveys Sub-section	4.1
6	Regional Surveyor	6.1
3	Research Officer	3.1
2	Senior Geodetic Surveyor	2.1
1	Surveyor	1.1

BENCH-MARK POSITION DESCRIPTIONS

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 1

Level: SUR-2

Descriptive Title: Surveyor

Point Rating: 264

Reporting to a Senior Surveyor:

Organizes and conducts specified cadastral surveys of Federal Crown lands located in the Region. Assembles, scrutinizes and evaluates evidence of previous surveys and existing land surveys affecting the survey project, including conducting the appropriate searches. Writes survey instructions for own use, estimates funds required for the survey and selects, hires and instructs seasonal laborers and instructs technical support staff. Oversees the field operations of a survey party. Performs computations in the field, check and verifies field notes and selects and maintains surveys instruments, field equipment and vehicles.

Coordinates and controls the compilation of land plans based on own field notes, to provide a record of the survey and its monumentation and an accurate basis for the description of land holdings.

Conducts a variety of other specified surveys of Federal Crown lands and other lands in the Region, such as topographical surveys, co-ordinate control surveys, ground control surveys and inspection surveys.

Readies vehicles and equipment for movement to or from the survey location; examines survey returns submitted by others; serves on committees to evaluate vehicle and equipment recommendations; writes reports on field operations.

Specifications

Degree/
Points

Knowledge

1 / 100

The work requires the ability to organize and conduct cadastral surveys, and to conduct other surveys such as topographical surveys using standardized methods and procedures. It also requires the ability to calibrate and operate optical and electronic survey instruments; to perform mathematical computations for processing survey data and determining the location of monuments and the direction of lines; to identify and evaluate the usefulness of physical, documentary and oral evidence of previous surveys in an area and evidence of existing land tenure; to write survey instructions for own use and legal descriptions of land holdings; to sketch plan manuscripts and control the compilation of land plans; and to instruct and supervise a field party.

The work requires a good knowledge of a wide range of land survey techniques, including traverse, offset, triangulation, and photocontrol; the methods, standards, practices and guidelines for conducting cadastral surveys; the relevant acts and regulations, such as the Land Surveys Act and the Land Titles Act, and departmental regulations on the operations of field survey parties. It also requires a good knowledge of the concepts, techniques and practices associated with topographical surveys.

Decision Making

AI / 100

The work requires locating physical, documentary and oral evidence pertaining to previous surveys and existing land tenure in an area, and evaluating conflicting or contradictory evidence, to establish or re-establish boundaries of specific land holdings. It also requires selecting the most appropriate survey method for a particular task in the field. For example, choosing among traverse, offset or photo control to plot natural boundaries, and triangulation or electronic distance measurement to survey across or around topographical obstructions. The work also requires determining the position of monuments; maintaining discipline and productivity of the survey crew and control of instruments, vehicles and operating funds; modifying survey project instructions and, on occasion, eliminating surveys when evidence indicates that they are not required or cannot be carried out with available information; and proposing layout of sub-division lots. Unusual technical, financial, administrative and personnel problems encountered in the field that necessitate significant changes in assigned survey projects are referred to headquarters for direction on the course of action to be followed. Surveys are carried out in accordance with guidelines, standards and approved practices set forth in handbooks and manuals. Reports are made to a supervisor at the intermediate professional level on the need for future survey projects in a specific area. Decisions affect the accuracy of documentation of specific land holdings and field expenditures for assigned projects. An error in judgment could result in unwarranted costs and delays in completing assigned projects, inaccurate documentation of specific land area, and in litigation.

Responsibility for Contacts

AI / 43

The work requires contacts with Registrars and Masters of Titles in Registry and Land Titles offices to obtain information and help in locating documentary evidence of previous surveys; with Territorial Land Agents of the Department of Indian Affairs and Northern Development to obtain information or help in determining ownership of land and to ascertain and evaluate future survey requirements and changes in project requirements; and with owners of land to obtain both information on property boundaries and permission to cross and measure their land.

Supervision

AI / 21

The work requires supervising the work of up to eight technical support staff and laborers in the field for about five months a year (three person-years).

1.3

LINEAR ORGANIZATION CHART Surveyor

Regional Surveyor

- Senior Surveyor
 - Surveyors* (2) EN-SUR-2
- Support (2)
- Head, Property Mapping
 - Mappers (2)
 - Drafters (2)

* Casual staff not shown.

2.1
BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 2

Level: SUR-3

Descriptive Title: Senior Geodetic Surveyor

Point Rating: 451

Reporting to the Head, Satellite Surveys Sub-section, Supplementary Control Section:

Plans, organizes and directs a series of a major field survey projects to extend and density the national horizontal control network by means of Doppler satellite observations and conventional survey methods.

Confers with superiors to determine project objectives. Collects and analyses information on the project areas concerning topography, transportation, weather patterns, communications, logistics and the extent, location and quality of existing surveys. Prepares project plans for approval and, once approved, prepares detailed estimates of time, funds, personnel, supplies and equipment required. Collaborates with other organizations in the planning of joint projects. Contacts agencies for permission to work in controlled areas such as parks and game sanctuaries.

Supervises junior surveyors and technical and support staff. Appoints party chiefs, provides training to staff, reviews work plans and schedules, and coordinates up to four widely dispersed sub-parties. Coordinates the deployment and distribution of vehicles, equipment, fuel, technical instruments, provisions and personnel among the sub-parties. Controls a field budget, the operation of a fleet of up to eight vehicles and arranges for the charter of fixed- and rotary-wing aircraft.

Prepares survey returns for submission to headquarters. Checks surveys for accuracy and to determine if observation is necessary. Prepares progress and project reports.

Specifications

Degree/
Points

Knowledge

2 / 157

The work requires the ability to design geodetic horizontal control networks using Doppler satellite positioning and conventional survey methods; to calibrate and operate a wide assortment of advanced survey equipment including Doppler satellite receivers, precise electro-magnetic distance measuring instruments, first order theodolites and spirit levels; to make a variety of precise measurements and calculations to identify and create horizontal survey markers bearing latitude, longitude and elevation; to collect and analyze data from past surveys and current information on topography, climate, transportation and communications present in survey areas to assess its usefulness for technical and logistical planning; to prepare survey instructions for use by senior surveyors and prepare final survey returns; to plan, organize and direct field survey operations anywhere in Canada involving up to four separate projects and nine employees, utilizing, as required, motor vehicles, fixed-wing aircraft and helicopters; and to instruct and supervise sub-party chiefs and allocate material and personnel resources among as many as four sub-parties.

The work requires a thorough knowledge of the principles, concepts, observing techniques and instrumentation for Doppler satellite positioning as well as for first order triangulation, trilateration and traversing; the capabilities and limitations of the various methods and instruments used to perform first order surveys; the theory and practice of geodetic survey methods; knowledge of developments in other areas in order to evaluate new equipment and methods and to write assessment reports and to provide advice and training on Doppler field operations and positioning. The work also requires a knowledge of the departmental regulations on operations of field survey parties.

Decision Making

B1 / 165

The work requires the designing, implementing and computing of geodetic field surveys in accordance with the specifications, policies and practices of the department.

The work also requires exercising authority on matters related to the operation of geodetic field surveys and preparing, for the approval of the Sub-section Head, plans of survey operations, including estimates of financial, personnel and equipment requirements.

In the field, the work involves allocating personnel, equipment and supplies among the various sub-parties; determining the best method of moving personnel and equipment in all parts of Canada; making work assignments and schedules for the sub-parties; deciding when the work has been completed to the required accuracy; revising plans in consultation with the Sub-Section Head to take advantage of unexpected opportunities, to overcome problems, or to accommodate changes in priorities; deciding on the need for maintenance and repair of equipment and vehicles and for the calibration of survey instruments; making recommendations concerning the purchase of survey instruments and equipment and the rehiring of casual employees. Decisions affect the accuracy, economy and completion date of national horizontal control surveys as well as the health and safety of the survey personnel.

Responsibility for Contacts

A2 / 63

Contacts are made with engineers and other professionals in various government agencies to exchange survey related information; with visiting foreign surveyors receiving training in Canada; with landowners to obtain permission to work on private property; with officials of equipment manufacturing companies to obtain information and advice about their products or to offer suggestions for improvements; with federal, provincial, municipal and private survey officials to exchange technical information, to obtain agreement on methods and procedures for survey activities of mutual interest and to provide advice on accuracy of survey instruments and techniques.

Supervision

B2 / 66

The work requires assigning and supervising the work of surveyors and technicians plus a variable number of employees for a total of nine person-years during the planning and implementing of geodetic field surveys.

LINEAR ORGANIZATION CHART

Senior Geodetic Surveyor

Chief, Supplementary Control

- Head, Inertial Surveys Sub-section
 - Surveyors (3)
 - Technical Staff (6)
- Head, Satellite Surveys

Senior Geodetic Surveyor* EN-SUR 3 -

Surveyor (2)

- Technician (3)

Senior Geodetic Surveyor

Senior Geodetic Surveyor

Surveyor

Computer Programmer

Surveyors (3)

Technicians (3)

* Casual staff not shown.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 3

Level: SUR-3

Descriptive Title: Research Officer

Point Rating: 486

Reporting to the Head, Terrestrial Applications Sub-Section:

Plans, organizes and conducts applied research and developmental projects in area of expertise for the application of modern technology, systems, methods and procedures to geodesy, to improve the efficiency, effectiveness and economy of geodetic survey operations. Assesses literature, reports and papers on new developments and investigates their application in other organizations. Discusses technical problems with operational staff in the branch to assess their concerns and identify their requirements. Recommends to the Head, the scope and content of studies and investigations and obtains approval for same. Leads small study teams in carrying out studies, investigations and field tests of new techniques and technology. Prepares progress reports and detailed evaluation of studies with commentary on the usefulness of new technology or techniques in practical application. If approved for practical use, advises on and assists operational divisions in the integration of new technology and techniques into their current activities. Provides an ongoing consulting service to operational divisions. Supervises study teams of one to three employees.

Specifications

Degree/
Points

Knowledge

3 / 214

The work requires the ability to plan, organize and conduct studies and investigations into the application of new or improved technologies and methodologies concerning geodesy. The work also requires the ability to assess and evaluate new developments and to prepare written reports on the outcome of investigations, including recommendations on implementation strategies; to calibrate, operate and test new and modified survey equipment; to make a variety of precise measurements and calculations to test and assess the accuracy and limitations of new equipment and methods; to collect and analyze data and information generated by a wide variety of survey organizations to assess their impact on current divisional equipment and methods; and to plan and coordinate the activities of small study teams engaged in field and in-house testing and analysis.

The work requires a thorough knowledge of geodetic principles, concepts and practices and of research and investigative methodology. The work also requires a good knowledge of technological advancements made by universities and other countries in related fields, including areas such as computer hardware and related software systems. Further, the work requires a good knowledge of the capabilities and limitations of new equipment and methods for conducting geodetic surveys to ensure the provision of an effective consulting service to operational divisions applying these new methods and using new equipment.

Decision Making

B1 / 165

General direction on the intent and scope of studies is provided by the Head. All costs and timeframes for studies are approved at a higher level. As investigations represent new departures within the field, implications of studies are not always evident at the outset. Errors in judgment with respect to methodology of studies or activities of team

members can lead to delays in the completion of work or repetition of parts of studies, leading, in turn, to higher costs, misuse of human resources and delays in implementing new technology or methodology.

Responsibility for Contacts

B1 / 86

The work requires contacts both in-house and with outside firms to plan and implement studies. Successful completion of studies and investigations is normally dependent on ensuring the cooperation and support of others for the goals and objectives of the study.

Supervision

A1 / 21

Members of project teams report directly to the incumbent and include both indeterminate and term employees. Team size ranges from one to three subordinates, depending on the size and nature of the project. Annual person-year average is one.

LINEAR ORGANIZATION CHART Research Officer

Chief, Research and Development EN-SUR -

Head, Computer Applications

- Computer Applications Officer
- Head, Terrestrial Applications
 - **Research Officer** * (4) **EN-SUR-3**
- Head, Satellite Applications
 - Surveyors (5)

* Project staff not shown.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 4

Level: SUR-4

Descriptive Title: Head, Inertial Surveys Sub-Section

Reporting to the Chief, Supplementary Control Section, Geodetic Survey of Canada:

Plans and organizes the annual field operations of the Inertial Survey Sub-Section to provide mapping control and special surveys throughout Canada using the Inertial Survey System. Reviews the projected areas for and extent of survey projects and the density and location of new survey control points against budgetary, human resource and time constraints and recommends survey activities according to their priority.

Assigns field projects to party chiefs in the form of detailed survey instructions. Reviews, obtains approval for and coordinates work plans and schedules prepared by field party chiefs and advises them on all technical, administrative and operational aspects of their work.

Oversees and inspects all ongoing field operations to resolve technical, administrative or operational problems and to ascertain that survey objectives are being met. Ensures all data has been collected and is safely transported to the field or headquarters computation centre. Reviews results of all surveys for accuracy before input to the data bank to ensure the quality of results.

Develops, evaluates and implements new or improved methods for collecting survey data. Reviews literature, past experience of survey parties and methods and procedures of other organizations to determine where improvements in methodology or results can be made.

Specifications

Degree/
Points

Knowledge

3 / 214

The work requires the ability to plan, organize and coordinate a number of concurrent control survey projects and the related computational and administrative work at headquarters; to evaluate the feasibility and suitability of alternate methods for executing such surveys and to make recommendations thereon; to coordinate the detailed planning and execution of surveys by staff of the Sub-section; to formulate solutions to technical and administrative problems not settled by subordinates; to formulate changes in methods, procedures, and instruments used in the Sub-section.

The work requires a thorough knowledge of the methods and specifications of establishing all types of control surveys; the theory of geodesy in the fields of horizontal and vertical control, astronomy, computations and adjustments; the mathematical foundations of geodesy, land surveying and astronomy; and the characteristics, operation, maintenance, uses and limitations of a wide variety of optical and electronic distance measuring equipment; the procedures and policies of the department in the areas of budgeting, purchasing and personnel and project administration. Unresolved problems such as responses to requests for specific surveys that are not a part of the immediate or long term objectives are referred to the Section Chief with a recommendation on the course of action to be followed.

Decision Making

B1 / 165

The work requires planning, implementing and adjusting inertial surveys in accordance with Departmental survey policies. The Chief, Supplementary Control, reviews all survey plans for conformance to policy and methodology. Short- and long-term financial requirements are discussed with the Chief prior to approval. The position has authority to take action on matters relating to the coordination of survey activities.

In the field, the work involves overseeing the activities of the survey parties and allocating human and other resources according to priority. Survey parties are contacted regularly to ensure conformance with survey objectives and to resolve technical, administrative or operational problems. The work requires making decisions on the need for and timing of equipment repair and upkeep and whether or not the work has been completed to the required accuracy. The Chief is consulted when significant problems arise such as the inability to complete a survey within timeframe or budget. Recommendations are made to the Chief on new types of equipment or methods and procedures for improving survey work. Decisions primarily affect completion, economy and accuracy of inertial surveys in accordance with approved schedules and funds.

Responsibility for Contacts

B1 / 86

The work requires contacting other professionals in own department to discuss ways of improving survey methodology; with engineers in other departments and electronic equipment companies to exchange information on measurement capabilities and accuracy of equipment; and with proprietors of electronic equipment companies to explain requirements and secure their cooperation in testing new equipment or techniques.

Supervision

B2 / 66

The work requires assigning and reviewing the work of a permanent staff of three professional surveyors and six technical staff. Additionally, eight employees are hired for the duration of survey party activities (two person-years) for a total of eleven person-years.

LINEAR ORGANIZATION CHART Head, Inertial Surveys Sub-Section

Assistant Director, Surveys

- Chief, Supplementary Control

Head, Inertial Surveys Sub-Section * EN-SLR-4

- Surveyor (3)
- Technical Support (6)
- Head, Satellite Surveys Sub-Section
 - Surveyors (4)
 - Computer Officer
- Operational Support (2)
- Operational Support (3)
- Chief, Primary Horizontal Control
- Chief, Primary Vertical Control

* Casual staff not shown.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 5

Level: SUR-5

Descriptive Title: Chief, Data Analysis and Adjustments Section

Point Rating: 758

Reporting to the Assistant Director, Data Management:

Plans, organizes and coordinates the operations of the Data Analysis and Adjustments Section, engaged in projects involving the computation of coordinates and associated relative accuracies for stations of the national horizontal control survey framework for use by own and other federal and provincial agencies as a control for mapping, cadastral surveys, engineering projects and studies and scientific investigations; and in the development of methods, procedures and computing programs for computing and analyzing geodetic data.

Evaluates and adapts improved computational and adjustment theory, methods and procedures. Reviews reports and publications, discusses new developments with staff of own and other organizations. Plans and coordinates testing and evaluation of new or modified methods and recommends their implementation.

Organizes and participates in conferences, symposia, workshops and courses to promote a better understanding of the need for geodetic surveying and geodesy and serves on national and international committees concerned with specific projects.

Supervises a permanent staff of 13 employees through three subordinates supervisors. Additional staff are added from time to time for special projects.

Specifications

Degree/
Points

Knowledge

5 / 328

The work requires the ability to plan, organize and coordinate a number of concurrent computational, adjustment, and development projects; to evaluate alternatives in respect of development of theory and methods and the implementation of adjustments involving survey work of several agencies; to evaluate field survey data using current statistical methods; to formulate solutions to technical and administrative problems not settled by subordinates; to suggest and implement changes in methods made necessary by advances in technology or changes in priorities.

The work requires a thorough knowledge of the types, methods, and specifications for terrestrial and satellite survey systems; the theory of geodesy and statistics related to computations, adjustment, evaluation and classification of surveys of all types; the application of the electronic computer to the solution of computational and adjustment problems and the procedures and policies of the department in the areas of budgeting, purchasing, personnel and project administration.

Decision Making

B2 / 232

The work requires evaluating, prioritizing and assigning projects being carried out for a number of private and public users; determining computing methods to be used to provide coordinates and accuracies commensurate with requirements; determining the need for developing computer programs to facilitate repetitive computations; recommending the implementation of long-term projects and scheduling such projects; recommending the integration of surveys of various agencies to form systems of surveys for which relative accuracy may be determined to an acceptable degree of confidence; evaluating reports on new methods of computing and new statistical methods of evaluation and classification; and recommending and implementing additional studies. Proposals are made on such matters as the need for strengthening existing survey networks, the specific additional data required and the advisability of subsequently retaining or recomputing coordinates and/or accuracy estimates; the need for users' guides and documentation for computer programs of interest to the surveying industry; and maintaining the liaison and understanding necessary between Geodetic Survey and divisions using coordinates to support mapping or legal surveys.

The work is assigned in terms of objectives and is reviewed to ensure accomplishment of objectives and fulfilment of commitments. Unresolved problems, such as responding to requests that are not part of immediate or long range objectives, are usually referred to the supervisor with a recommended course of action.

Decisions affect significant annual expenditures in computing costs; the use and maintenance of computing facilities such as desk top computers, calculators, and computer terminals; the effective use and development of a permanent staff of 13 employees; the accuracy and reliability of coordinates and their usefulness to agencies in other countries, the department, other federal departments, provincial and municipal agencies, private survey companies, and individuals. An error in judgment could result in the distribution of inaccurate and incorrect data and lead to delays in either the production of accurate mapping or the establishment of accurate provincial coordinate control systems, and the unwarranted expenditures involved in recomputation.

Responsibility for Contacts

B2 / 106

The work requires contacts with associates of the United States National Geodetic Survey and the Danish Geodetic Institute to plan and coordinate joint projects; with provincial directors of survey to plan and schedule computations for existing surveys and to provide advice and guidance on the design and computation of proposed survey networks within their jurisdiction; with municipal officials and private surveyors to provide advice on computing methods and availability of computer programs for solving particular problems.

Supervision

C2 / 92

The work requires the supervision of a permanent staff (13 person-years) of professional and technical employees engaged in the development of methods for and subsequent computation of coordinates and associated accuracies. It also requires the supervision, through subordinates, of twenty-four additional casual and seasonal support staff (six person-years), for a total of 19 person-years.

5.3

LINEAR ORGANIZATION CHART

Chief, Data Analysis and Adjustments Section

Dominion Geodesist and Director, Geodetic Survey

Assistant Director, Data Management

Chief NAVD Project

Chief, Data Analysis and Adjustments Section* EN-SUR-5 -

Head, New Data and Adjustment

- Data and Adjustment Officers (3)
- Data and Adjustment Support (3)

- Head, Computations Sub-section
 - Computations Officers (3)
 - Computations Support (2)

* Casual staff not shown.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 6

Level: EN-SUR-5

Descriptive Title: Regional Surveyor

Reporting to the Assistant Director, Legal Surveys Division:

Provides a senior consulting, advisory and liaison service to other federal and provincial departments, band chiefs and councils and others with respect to legal surveys, property mapping and land title matters to facilitate the orderly development and administration of Crown Canada lands in the Region; plans and control the surveying activities of the Regional Office, including property mapping, legal surveys and investigations for clients such as the Department of Indian and Northern Affairs and Environment Canada (Parks Canada Branch); develops and administers a Multi-Purpose Land Information System (MPLIS) to assist clients in effectively administering lands; supervises a group of land surveyors and support staff.

Specifications

Degree/
Points

Knowledge

4 / 271

The work requires the ability to plan, organize and direct concurrent regulatory and other survey activities; provide liaison and consultative services to federal and provincial departments and agencies and band councils, including the examination of contentious cases; set priorities for the planning and execution of legal and other surveys for client organizations and assess the type of survey required and whether it is best carried out in-house or by contract; prepare detailed survey instructions and evaluate completed work, taking the appropriate action where work does not meet prescribed standards; adapt departmental policies and procedures to specific regional needs; develop and implement a system of property mapping (MPLIS); and supervise professional and support staff.

To provide a liaison and consultative service to clients and to manage the survey activities of the Region, the work requires a thorough knowledge of geodetic and topographic surveying, procedures for searching land title records, photogrammetric and photomapping techniques and federal and provincial legal and regulatory requirements, and departmental policies and procedures with respect to surveying. The work also requires a good knowledge of the objectives of client departments, agencies and organizations and a knowledge of contract administration and financial and administrative procedures.

Decision Making

B2 / 232

The work requires evaluating the relative priorities of survey projects for various clients; determining the need for, type and timing of surveys and whether they are best conducted by in-house or contract resources; following consultation with clients, determining the nature of any survey or land related problems and the optimum method(s) for resolution; recommending to the assistant director at Headquarters the extent to which the division should become involved in assisting and advising band councils regarding legal surveys, property mapping and methods of identifying lands to be acquired for reserves. Recommendations and decisions affect the timeliness, quality and cost of

surveys and the quality of consultative advice in the Region and the ability of surveys to meet the standards and objectives of the Canada Land Surveys Act (CLSA) and the Surveyor General for Canada. Inappropriate recommendations can lead to costly litigation, the need to redo surveys and dissatisfaction among clients, resulting in loss of time and money and embarrassment to the Department.

Responsibility for Contacts

B2 / 106

The work requires contacts with band councils, land researchers, and treaty negotiators representing various organizations in the region to discuss matters concerning land boundary conflicts between band councils and the provincial government or private landowners, to attempt to obtain agreement on courses of action to overcome unresolved differences; with the Provincial Surveyor General and the Director, Surveys and Mapping for the province to confer on matters concerning procedures and interpretations of provincial regulations and statutes where these conflict with federal regulations, to discuss the Provincial Base Mapping Program and its use by the region office, and to resolve survey matters including common boundaries between federal and provincial lands; with the Examiner of Survey, Land Boundaries Program of the provincial government to develop means of registering documents and to discuss requirements for obtaining approval of plans for registration; with private surveyors, lawyers, consulting engineers, town planners, photogrammetric survey companies and city engineers to confer on survey projects, to engage surveyors in projects, initiate contract surveys and to give advice.

Supervision

C2 / 92

The work requires the supervision of a permanent staff of 17, including seven professional land surveyors.

LINEAR ORGANIZATION CHART

Regional Surveyor

Director, Surveys

- Assistant Director, Legal Surveys

Regional Surveyor EN-SUR-5

- Head, Property Mapping
 - Mapping (2)
 - Drafting (3)
- Head, Survey Program
 - Head, Parks Program
 - Field Operations(3)
 - Regulation (6)