

Regulations for conducting the Survey of Land in New Zealand.

IN pursuance and exercise of the powers and authorities conferred by the Surveyors' Institute and Board of Examiners Act, 1908, the Surveyors' Board doth hereby make the following regulations for the conduct of surveys, and for ensuring the accuracy of plans and surveys required under any Act relating to or affecting the surveys of land, except surveys carried out by or under the direction of the Surveyor-General; and doth hereby revoke all regulations heretofore in force for like purposes made under section 3 of the Land Act, 1908, or under the Surveyors' Institute and Board of Examiners Act, 1908.

PART I.—GENERAL REGULATIONS.*Interpretation.*

1. In these regulations, if not inconsistent with the context,—
 "Surveyor-General" and "Chief Surveyor" mean the persons holding such official positions respectively, or the persons for the time being acting for either of these officers, in the Department of Lands and Survey;
 "Surveyor" means a person holding a license from the Surveyors' Board to execute surveys within the Dominion of New Zealand, and, in respect of Land Transfer surveys, licensed also by the Surveyor-General in that behalf;
 "Board" means the Surveyors' Board constituted under the Surveyors' Institute and Board of Examiners Act, 1908.

Knowledge of Acts and Regulations necessary.

2. A surveyor conducting surveys under the regulations should make himself conversant with the provisions of the Surveyors' Institute and Board of Examiners Act, 1908, and all other Acts and regulations a knowledge of which is necessary to enable him to efficiently discharge his duties as a surveyor. (See Appendix A.)

Surveyors to comply with Departmental Rules.

3. A surveyor effecting any survey under the regulations shall comply with all departmental rules and directions supplementary to these regulations, and not contrary thereto.

Special License under Land Transfer Act.

4. Every survey for the purposes of the Land Transfer Act, 1915, shall be made by a surveyor specially licensed by the Surveyor-General under that Act, and every such survey, and every plan purporting to represent the same, shall be made in accordance with these regulations and such amendments thereof as may from time to time be authorized.

Information not to be withheld.

5. It shall be the duty of every surveyor making surveys under these regulations to study the interests of the State in all his operations; to disclose all doubts, discrepancies, and difficulties; and to afford all such other information obtainable by him relating to the survey as will aid in securing accuracy and completeness in the title to the land.

Penalty for Unreliable Surveys.

6. (a.) If the work of a surveyor shows that he has neglected to comply with these regulations, or is found to be inaccurate or defective, he may be called upon to rectify such default or error at his own cost.
 (b.) The Surveyor-General may take such action as he may think fit with a view to the suspension or cancellation of such surveyor's special license under the Land Transfer Act, or may report the matter to the Board, which shall inquire into it and deal with the surveyor in accordance with the provisions of section 16 of the Surveyors' Institute and Board of Examiners Act, 1908.

Surveyors to obtain all Information before effecting Surveys.

7. Before making a survey the surveyor should obtain all information respecting the subject land and adjacent lands in the offices of the District Land Registrar and the Chief Surveyor of the land district in which the survey is situated.

Surveyors exempt from Payment of Fees.

8. Surveyors desiring to consult working plans, record or other survey maps are not to be charged fees for inspection, or for taking tracings therefrom when required to enable them to carry out surveys.

Surveyor to comply with Requisition for Amendment of Survey.

9. On receipt of a requisition from the Chief Surveyor to amend a survey or to supply more information concerning it than is contained in the field notes or shown on the plan, the surveyor concerned shall promptly comply with the requisition.

Disputes in relation to Conduct of a Survey.

10. In the event of a dispute arising between the Chief Surveyor and a surveyor as to whether any survey made under these regulations has been properly effected, the matter may be referred to the Surveyor-General, who shall inquire into it and advise the Chief Surveyor and the surveyor of his finding.

FIELD NOTES OF SURVEY.

Size of Field-books.

11. Field notes shall be recorded in a book of regulation size suitable to the extent of the survey of which it is a record.

Field-books issued by the Chief Surveyor are the Property of the Crown.

12. Field-books will be issued on request to the surveyor by the Chief Surveyor, who shall give a number to each field-book issued, and enter it in his Register of Field-books; such field-books are and remain the property of the Crown.

To be carefully kept.

13. Field-books shall be so clearly kept as to enable a qualified draughtsman, without other information than it affords, to draw a true plan of the survey.

The First Page.

14. The first page of each survey in every field-book shall contain the title of the survey, with particulars of the block, district, town, &c., in which it is situated; the date of the commencement of the survey; and the signature of the surveyor.

Certificate that Tapes used have been compared with Standard.

15. Field-books shall contain a statement by the surveyor that the tapes used on the survey have been compared with one of the authorized standard bands, and that they are correct under a tension of 15 lb. at a given temperature.

Method of Entry in Field-books.

16. The notes shall be recorded in the field-book with a sufficiently hard black-lead pencil. In no case shall the original pencil notes be obliterated or erasures be allowed; every alteration made by the surveyor must be clearly shown. Erroneous entries should be crossed out and rewritten.

Field Notes to give Full Information.

17. The notes shall show everything that the surveyor does in the field, and what he finds to exist on the ground, such as bearings, distances, old pegs tied on to or replaced, offsets, position of fences, buildings, walls, roads, rights-of-way, subdivisions, &c.

Measurements to be in Links.

18. Lengths shall be entered as read in links and decimal parts of a link; corrections for hypotenusal measurement, sag, and temperature shall be noted, and the lengths deduced therefrom clearly shown.

Offsets to be taken.

19. Offsets shall be taken to natural or other features. The geological features of the land, the nature of the water-supply, soil, and timber along and adjacent to the lines of survey shall be recorded.

Names to be recorded.

20. All known names of rivers, creeks, hills, lakes, &c., shall be recorded.

Field Notes to be certified to.

21. Each page of a field-book where notes appear shall be initialled by the surveyor, and shall bear the date on which the survey was made.

Field-book shall accompany Plan.

22. In respect of all surveys, plans of which are to be deposited either with the District Land Registrar or the Chief Surveyor, in every case the field-book shall accompany the plan of survey.

Field Notes the Primary Record of Survey.

23. As the field notes are the primary record of survey, are accepted as evidence in a Court of law, and are for departmental reference, it is of importance that they should be precise and complete, indexed for purposes of ready reference, and kept in a neat and systematic manner. (See Appendix B.)

*FIELD WORK OF SURVEY.**Standard Band.*

24. Every surveyor shall keep a steel or invar band to be used solely as a standard; such standard band shall not be used until it has been compared by an authorized officer of the Department of Lands and Survey, and certified as correct under a tension of 15 lb. at a given temperature. The surveyor shall have his standard band tested annually, and at such other times as the Surveyor-General may direct.

Field Measurements.

25. Field measurements shall be made with a steel or invar band or tape, tested at frequent intervals with the surveyors' standard band. A tension of 15 lb. shall be applied by means of a spring balance, carefully tested for index error, and the measurements corrected for the difference of temperature above or below the temperature at which the band is standard length.

Theodolite.

26. A transit theodolite of a diameter of not less than 5 in., in accurate adjustment, shall be used on all surveys under these regulations. The use of a theodolite of a different pattern or of a smaller diameter will not be permitted except with the consent in writing of the Surveyor-General.

Bearings referred to the North Point.

27. Bearings shall in every case be measured in degrees, minutes, and seconds of arc, from the north point of the true meridian of the initial station as zero, in a clockwise direction, from 0° to 360° .

Angles to be measured on Both Faces.

28. Angles shall in every case be measured and repeated with instrument "face left" and "face right," the first and final readings being recorded in the field-book, as well as the adopted mean value of the angle.

Angular and Linear Measurements to be recorded in Detail.

29. Instrumental observations to determine the bearings of lines, the actual measurement of lengths, and the angles of elevation and depression shall be clearly recorded in detail in the field-book.

Sets of Readings.

30. At each station of a connecting triangle a complete set of readings shall be taken as follows:—

- (a.) Face direct: Vernier A set approximately to back bearing of the station of origin; all other stations being observed in consecutive order from left to right, the return reading of origin being also booked, care being taken not to overshoot any station.
- (b.) Vernier A being moved on 90° , a second round is taken in the same manner.
- (c.) Face reversed: Vernier A is set forward 45° and a third round taken as before.
- (d.) Vernier A is moved forward 90° and a fourth round taken, which completes the set.

The method of entering the readings is shown in the specimen page of field-book. (See Appendix C.)

Limit of Error.

31. The limit of error in the summation of the angles of a triangle must not exceed $20''$.

Initial Bearing.

32. The bearing adopted as origin shall be clearly shown on the plan, and the closing and check bearings shall be also shown in the field-book.

New Survey to be connected to Triangulation or to Old One.

33. Where a trigonometrical survey is in existence all surveys shall be connected to it either by well-conditioned triangles or by direct chainage, except in cases where the survey is adjacent to prior surveys which have been sufficiently connected to the triangulation and in which the survey pegs have not been disturbed.

Alignment of Old Survey to be verified.

34. In every case where a new survey is connected with an old one the surveyor shall range sufficient of the old boundary to verify the alignment thereof.

Datum of Survey to be described.

35. The datum upon which a survey is based shall be shown on the plan; if obtained by the adoption of an original boundary, the original marks found on it and the data by which they were identified shall be described in the field-book.

Limit of Angular Closure.

36. The angular closure of the points of intersections of all surveyed lines shall be shown. Should the error in closing exceed the undermentioned limits the work must be revised:—

Rural surveys: 2 minutes of arc in open, level, or undulating country;
3 minutes of arc in bush or rough country.
City and town surveys: 20 seconds of arc in lines over 10 chains in length; 90 seconds of arc in short lines.

Limiting Error of Lineal Closure.

37. Rural surveys: 2 links per mile in level and undulating country;
4 links per mile in rough and hilly country.

City and town surveys: 1 link per mile in level and undulating country; 2 links per mile in rough and hilly country.

Should the work of a surveyor exceed the above-mentioned limits such survey must be revised. As accurate surveys and a high standard of work should be the first object of surveyors, they will be expected to obtain as nearly as possible a true closure, and the accumulated error shall not exceed 10 links.

Topographical Information to be obtained.

38. In every survey the position of all buildings, improvements, tracks, watercourses, &c., on or near the line of survey shall be noted and shown on the plan.

COMPUTATIONS.

Traverses to be co-ordinated on Initial Station.

39. All traverses executed by the surveyor are to be computed and co-ordinated in terms of the meridian and perpendicular of the initial station.

Connecting Triangle.

40. The calculation of a connecting triangle is to be made and recorded upon the printed form. The co-ordinates of all stations are to be reduced to the meridian and perpendicular of the initial station of the circuit. (See Appendix D.)

Repairs to Trigonometrical Stations.

41. Surveyors shall report to the Chief Surveyor all trigonometrical stations that are seen to be dilapidated, and surveyors engaged on Government work shall renew all stations that are out of repair, or report their inability to do so. All renewed stations are to retain the same letter or number as the originals.

Measurements to be checked by Closure.

42. The measurements made on each survey shall be checked by the calculation of the difference of latitude and departure of each line, computed to tenths of links for rural and to hundredths of links for town surveys. These computations must be kept up to date so that measurements do not get in advance of this mode of check.

Computations to be forwarded.

43. Calculation of closure on the authorized forms shall be dated and signed by the surveyor, and forwarded with the field-book and plans to which they refer. The number of the field-book and of the respective pages shall be shown in the proper column of the printed form. (See Appendix E.)

Areas by Double Longitudes.

44. Areas of portions or subdivisions, except such as are rectangular, shall be accurately computed by double longitudes on the authorized printed forms. (See Appendix F.)

Limit of Fractional Quantities in Areas.

45. After computing the exact areas of portions, modifications to avoid fractional quantities, not to exceed one-sixteenth per cent. less than the exact computed area may be made in areas of rural land. The maximum number of perches by which a computed area may be modified is therefore equal to a tenth part of such area expressed in acres.

Planimeter Areas accepted.

46. The areas of figures bounded by watercourses, or irregular curved lines fixed by offsets from the traverse-lines, should be obtained by computing the portion of the area within the closed traverse-lines by double longitudes and using a planimeter to determine the portion of the area between the traverse-lines and the boundary; and in cases where the boundary consists of a large number of sides a limited use of the planimeter will be permitted to determine a portion of the area of which the greater portion is computed mathematically.

Drafting.

47. All plans shall be drawn by the surveyor, or under his supervision, on mounted drawing-paper of the best quality and according to regulation size. (See Appendix G.)

Scale and Size of Plans.

48. The dimensions of plans and the scales to be used in connection with surveys under the several Land and Native Acts are prescribed in Appendix G hereto. In cases where details are numerous plans shall be enlarged to a scale suitable for showing such details clearly.

Position of North Point.

49. Plans shall be accurately plotted, and shall read with the north point upwards, unless there is sufficient reason to the contrary, as in the case of railway-land plans.

Defence Works.

50. In preparing maps and plans (other than for the Defence Department) no reference whatever is to be made therein to forts, works of defence, submarine mining, torpedo establishments, electric-light emplacements, wireless stations, &c.; and public plans should not show these works.

Meridian and Perpendicular Lines.

51. Meridian and perpendicular lines shall be drawn in blue colour at exact distances of 5 in. apart, and in their true relative positions to the circuit initial station; from these lines the boundaries and traverses are to be set off from the computed co-ordinated distances in the traverse tables. An ordnance protractor may be used in filling in topographical detail.

Diagrams.

52. Diagrams, on enlarged scales, may be drawn on plans to show clearly details of measurements or of improvements.

Title.

53. The title of the plan shall be printed on the plan form in bold letters in the space provided for it, and shall show the numbers of the subdivisions, allotments, sections, or portions measured, blocks, the names of the survey district, county, town, or other particular locality in which the survey is situated, the surveyor, the date of survey, and the scale of the plan.

Field-book Number to be noted on Plan.

54. The number and the pages of field-book containing field notes of the survey shall be written on the plan.

Delineation of Lines.

55. All boundaries shall be ruled in firm lines. Measured lines are to be drawn in red, calculated lines in black, with figures in red and black respectively. Bush lines cut but not chained are to be drawn in red, the linkages in black. Observed bearings are to be written in blue, and those calculated in black.

Traverse-lines.

56. Traverses shall be ruled in firm red lines; the reduced measurements made and the bearings observed in the field shall be written along the lines in red and blue figures respectively, or in special cases these particulars may be written in a tablet on the plan form.

Traverse Stations.

57. Traverse stations shall be numbered and shown as follows:—
- (a.) New pegs shall be shown by small red circles.
 - (b.) Old pegs, when adopted but not found, by small black circles.
 - (c.) Old pegs, when found, by small black circles filled solid.
 - (d.) Old pegs renewed, by a red circle enclosing a black circle filled solid.
 - (e.) Iron tubes, by two small concentric blue circles.
 - (f.) Iron spikes, by small blue circles.

- (g.) Peg and spike together, by a red circle enclosing a blue circle.
- (h.) Posts, by solid black squares.
- (i.) Concrete pegs, by a small yellow circle. (See Appendix H.)

Trigonometrical Stations.

58. Trigonometrical stations shall be shown, when they are upon or adjacent to portions represented on a plan, as follows:—

- (a.) Connecting triangle or minor trigonometrical station, by two concentric red circles.
- (b.) Major triangulation station, by three concentric red circles.
- (c.) A station on which a permanent iron or wooden signal is erected shall have a blue or black cross respectively, drawn as diameters to the circles denoting the station.

In every case the letter or number designating the station shall be printed beside the symbol. (See Appendix H.)

Adopted Prior-survey Data.

59. Adopted prior-survey data shall be shown in black, and noted as such, with the official number of the original plan.

Coasts and Watercourses.

60. Lines of coasts, banks of rivers, creeks, &c., where surveyed shall be shown by firm blue lines, and, where unsurveyed, by broken blue lines. Opposite sides of watercourses and an arrow pointing down-stream shall be sketched on plans.

Plans must show Details.

61. Every plan must show, with their respective names, all roads, streets, passages, thoroughfares, rights-of-way, easements, or reserves set apart for public use, and also all the subdivisions into which the land has been divided, marked with distinct numbers, and must show the areas of the said subdivisions.

Aboriginal and Local Names.

62. The locally known or aboriginal names of all natural features shall be given when they can be ascertained. Where possible, the meaning or origin of the name should be given in the forwarding letter.

Plan must show Widths of Roads, &c.

63. The widths of all roads, streets, lanes, or rights-of-way adjoining the land under survey shall be recorded in the field notes and be shown on the plans.

Colouring.

64. Roads, streets, and public rights-of-way shall be coloured with burnt-sienna; railways, river-bank and coast reserves, with a permanent red; watercourses, lakes, seas, &c., with Prussian blue; forest, bush, and scrub, with green; hills shall be shaded with indian ink or other standard colour. (See Appendix J.)

Alterations must be initialled.

65. After the approval of the plan, additions or alterations shall be made only by the surveyor who signed it, and with the approval of the Chief Surveyor: Provided always that in the correction of any such error the original words or figures shall not be erased or rendered illegible, and the date of alteration shall be affixed and initialled.

Inspection of Original Plans.

66. Original plans, block-sheets, and record plans are open to surveyors and professional draughtsmen only, under the supervision of the officer having charge of the plans, when not in use by the Department; but other compiled plans are open to the public.

Plans, &c., Government Property.

67. All plans and field-books deposited with any Chief Surveyor, District Land Registrar, or inspecting officer for examination become the property of the Government, and their return for alteration, correction, or addition does not give to the person to whom they are returned any right or claim to their retention.

All plans, field-books, tabulations, or other documents returned to surveyors for correction are to be sent back to the Chief Surveyor with all reasonable despatch, and any unnecessary delay in this respect will be reported to the Surveyor-General.

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Certificate by Surveyor.

68. A certificate specifying date, personal survey, and compliance with the regulations shall be written upon the plan and signed by the surveyor. (See Appendix K.)

Date of Survey.

69. The date of survey in certificate on plan should be the date on which measurement was completed on the ground.

Plans to be forwarded promptly.

70. As surveys are completed the plans thereof and all other documents relative thereto, if for deposit either with the Chief Surveyor or the District Land Registrar, are to be forwarded promptly. The forwarding letter should be sent under separate cover, so that inquiry may be made for mislaid or delayed plan packets.

Plans to be rolled.

71. Plans should not be folded, but rolled. They must be put on stout wooden rollers or within plan-cases, securely fastened, legibly addressed, and sufficiently prepaid before transmission to the place of lodgment. It is preferable that they should be sent by "Fragile" post.

Wilful Destruction or Removal of Survey-mark.

72. The penalty for destroying, mutilating, defacing, taking away, or altering the position of any trigonometrical station, survey peg, mark, or pole fixed or set up by any surveyor is a fine not exceeding £50 or a term of imprisonment not exceeding two years, with or without hard labour.

Obstructing a Surveyor on Duty.

73. Every person who wilfully obstructs any surveyor or his assistants in the performance of their duties is for every such offence liable to a fine not exceeding £50.

Surveys to be made by Licensed Surveyors.

74. Surveys pertaining to title shall be executed in person by the surveyor receiving the order or authority, or by a licensed surveyor acting directly under his supervision. In the latter case the plan shall bear the signatures of both.

PART II.—SETTLEMENT SURVEYS.

Survey Districts and Blocks.

75. Survey districts are known by name. A full-sized one, as a rule, is a square area of $12\frac{1}{2}$ -miles sides, oriented on the meridian and perpendicular of the initial station of the meridional circuit in which it is contained. The district is divided by lines, parallel and perpendicular to the meridian, into sixteen square blocks of $3\frac{1}{8}$ -miles sides. On the plan the blocks are numbered by Roman numerals. The numbers commence at the north-west corner and continue towards the east on the top row from I to IV. The second row of blocks commences with V, immediately to the south of I, and so on throughout the district.

Irregular Districts.

76. When a district has an irregular boundary the same order of numbering must be followed so far as the area will allow, care being taken to use the numbers consecutively. The lines dividing districts and blocks should be straight, unless where road-lines, rivers, or section-boundaries approximate the right line, in which case they should be adopted. A survey block should not exceed in length or breadth the distance of 250 chains unless under special circumstances.

Sections to be adapted to Country.

77. Flat or easy undulating country shall be laid off in rectangular sections, but in rugged or hilly country their form must be modified to suit the ridges and valleys, and also, in the case of rolling arable land, care must be taken to arrange boundaries favourable to ploughing operations. Where the country is suitable it is desirable to have the boundaries on the meridian and perpendicular, but when the general features run obliquely to these, especially in rough districts, the boundaries must be arranged accordingly, so as to form lines which can be easily fenced, but the less diversity of bearing the better. When road-lines sever sections the areas of the severed portions, and also the total net areas of the sections, are to be shown on the map. The sections are numbered on the plan by Arabic numerals. The method of numbering is shown on Plate I.

Form and Scheme of Sections.

78. Sections are to have as nearly as practicable a depth of not less than twice the width or frontage to a road, stream, lake, or coast; but where the land is open for selection before survey the sections must have a depth of not less than 40 chains, and must conform to a general scheme, with frontages, depth, &c., as may be approved by the Chief Surveyor and the Land Board. Practicable road access shall be provided for each section.

Boundaries, how marked.

79. All boundaries of blocks and sections shall be pegged at every angle. In open country, straight boundary-lines under a mile in length must be cleared where necessary, and distinctly marked by pegs and lock-spits at intervals not exceeding 30 chains, which, however, at the discretion of the Chief Surveyor, may be varied to suit the conformation of the country. Advantage should be taken of the most prominent and favourable positions on the line for the pegging, so that the direction may be seen from peg to peg.

Boundary-lines in Forest Country.

80. In forest country the boundary-lines shall be cut, ranged, and pegged in the same manner and at similar intervals, advantage being taken in rough country of ridge-crossings for the pegging, in which case, where measurements are not required, subject to the approval of the Chief Surveyor, only such cutting of the line will be required as will ensure adjacent pegs being visible from each other, but it must be sufficient to enable the distances of such pegs along the line to be arrived at approximately for showing on the map. Under any circumstances the lines must be cut from the frontage from 3 to 5 chains and pegged, but should the peg come in an impracticable or unsuitable position for extending the line, then the cutting must be continued until the peg can be placed in a position that will enable this to be done, and in either case its distance from the front peg must be noted in field-book and on maps.

Pegging at Intersections.

81. The points of intersection of all section-lines with traverse-lines shall be pegged, measured to, and noted on the map, and should the section-pegs be off the traverse-lines, the distances of the section-pegs from such points shall also be given. The measured or calculated distances from the section-pegs to the adjacent road-angle pegs on same side shall be given, and the boundary of a section intersecting a road in all cases shall be pegged on the traverse-line as well as on both sides of the road. Such traverse intersection-pegs, however, should be driven flush to avoid confusion.

Line-cutting.

82. Lines in bush shall be cut and cleared 4 ft. wide, the scrub cut close to the ground, and overhead 7 ft. from the ground. All trees 3 ft. through and under to be cut down, and the height of the stump should not exceed its diameter. In open country, with scrub, the lines shall be cut and cleared at least 2 ft. wide.

Traverses and Trig. Connection.

83. In traversing, the surveyor is to proceed to the nearest trig. station and base his work on the circuit meridian, clearly denoting on the plan the line and the bearing used as origin, and the co-ordinate value in terms of the initial of the circuit. Connections should be made with trig. stations or other established points when opportunity offers to test the accuracy of the work.

All traverse stations should be pegged *before* being measured or observed to, and the surveyor when at a trig. station should take readings be traverse or subsidiary stations in view. All check bearings should be repeated and thrown forward, so as to limit the accumulation of instrumental errors, and checks and closures must be noted in the field-book. Vertical angles required to reduce all inclined measurements to their horizontal values are to be observed by theodolite.

Magnetic Bearing.

84. Magnetic bearings are not admissible except for filling in topographical detail work, and that very sparingly, and only with the permission of the Chief Surveyor.

Offsets.

85. Offsets to irregular boundaries such as rivers, streams, terraces, and fences must not exceed 2 chains in length, and must be taken at intervals in the traverse not greater than 3 chains, but at shorter distances when necessary to correctly define the irregularities of such boundaries.

Astronomical Check.

86. In case of long traverses in the bush where check bearings cannot be obtained, recourse should be had to stellar or solar observations for checking bearings, such observations being duly noted in field-book and referred to on plan. (See Appendix Q.)

Recording Observations.

87. Trigonometrical observations and connections shall be given in detail on the proper forms. The astronomical observations and the results derived therefrom shall also be entered on the forms and forwarded with the plan. (See Appendices C and D.)

Road Traverse.

88. After being graded and located in the manner provided by Regulation 102 the road-lines shall be traversed along the centre, the traverse stations being selected on the line of the grade as nearly as may be, or one of the sides may be traversed, care being taken that the graded line is near the centre of the road reserve.

Traverse of Formed Roads.

89. Formed roads of regular width that are fenced or bounded by hedges shall be traversed on an offset line parallel to and included within the sides where practicable.

The stations of the traverse are to be marked by iron tubes, in some cases set in concrete, if directed by the Chief Surveyor.

River-bed Traverses.

90. In cases where traverses are carried along or through an open river-bed, and the stations are not on safe ground, it will be necessary at intervals of not more than 40 chains to place reference pegs or iron tubes properly connected with the traverse in secure positions on the banks, and record their positions in field-books and on plans. This also applies specially to dredging claims.

Hanging Traverses.

91. Hanging traverse-lines will not be accepted except in cases where it is not feasible to obtain a closed circuit, and in such cases all hanging lines shall be measured and observed twice, and a certified note recorded on plan and in field-book.

Close on to Former Surveys.

92. The connection and close with former surveys must be clearly shown. Should "adopted" work fail to close with the new work within the limit of error prescribed by these regulations a resurvey of the old work must be made to close the survey.

Adopted Work.

93. The Chief Surveyor, before permitting old work to be "adopted," may, in his discretion, require it to be verified or resurveyed.

Elimination of Error.

94. Errors in bearing not exceeding the limits prescribed in Regulation 37 shall be distributed, the distribution being shown in the field-book and the amended bearings entered on plan and traverse-reduction sheets. The errors of close in latitude and departure shown on these sheets, if within the prescribed limits, shall be distributed thereon by the following rule: "As the total length of the traverse is to the length of each line, so is the whole error in latitude or departure to the correction of the corresponding latitude or departure, each correction being so applied as to diminish the whole error in latitude or departure."

Tabulations.

95. The positions of the terminals of all chained lines, excepting range-pegs, all corners of blocks or of isolated sections, whether chained to or not, and all intersections of section-boundaries with traverses, shall be calculated and tabulated.

Origin from Prior Survey.

96. When initial values are adopted from former surveys, references to volumes and folios of tabulations from which such values have been adopted shall be given on the new traverse-sheets.

Prior Claims.

97. All adjacent or included prior claims and surveys and their boundaries shall be investigated, and, if necessary, redefined in accordance with the titles and original plans. These claims shall be surveyed as held by established or indicated marks on the ground, and shall be shown on the map by black lines if the boundaries disagree with recorded measurements based on original plans and descriptions. If owners of prior claims cannot be found, and if the marks of their claims are obliterated, then it will be competent for the surveyor to re-establish the boundaries by actual survey. A general rule is, not to interfere with original boundaries; but, the surveyor being in doubt, the matter must be referred to the Chief Surveyor for decision.

Isolated Sections.

98. In surveying an isolated section or claim the surveyor shall proceed to the nearest geodesical or trigonometrical station, or to other properly established survey point, and connect his section-work by well-conditioned triangles or by traverse with such other station or point.

*ROADS.**Grades, Curves.*

99. Main roads, where practicable, should not have a steeper grade than 1 in 20 or a sharper curve than 66 ft. radius when formed. District roads should be laid off with grades not exceeding 1 in 15, and having no curve less than 33 ft. radius when formed. The grades in cross-roads should not exceed 1 in 12. Under certain conditions steeper grades may be permitted with the consent of the Chief Surveyor.

Widths.

100. All roads, as far as practicable, must be on the sunny sides of hills and spurs, graded on the best lines obtainable, and be reserved to a width of not less than 66 ft. In broken country, and where heavy cuttings and banks occur, the width of a road must be increased where necessary.

Widening at Watercourses.

101. At crossings of watercourses where it may be desirable to increase the width of a road it is better to make the road boundaries approaching the crossing diverge to attain the required width than to mark rectangular reserves on the banks of the watercourse.

Grading.

102. In grading roads along sideling ground, when the difference in level between the terminal points will permit, it is advisable while running round sharp curves and gullies either to keep the line level, or to ease the grade where required, to allow for through cuttings and banks being made at some future time to straighten and shorten the road without unduly increasing the grade, and, where necessary, sufficient land should be reserved to allow of this being done. In fact, wherever practicable, the grade on the finished road should be eased at sharp turns. In certain cases longitudinal and cross sections will be necessary, for which special instructions will be given. All gradients steeper than 1 in 20 should be written on the plan, with arrows indicating the direction of fall. Grade-lines should be marked with stakes not less than 2 in. diameter at intervals of a chain, more or less, according to the ground.

Pegging and Width.

103. In level or undulating country the opposite road-angles shall all be pegged; but in rough hilly country, where land is of little value and the traverse-lines short and intricate, the outside pegs at each angle may be dispensed with, and the road shown by straight lines, the ends of which shall be pegged and connected with conveniently situated traverse pegs. The lines bounding the road in such cases need not be parallel, but must not approach nearer than 50 links to the centre of the road, nor be distant therefrom more than 150 links without permission of the Chief Surveyor.

Delineation.

104. In whatsoever manner the side lines of the road are laid off, the bearings and lengths thereof must be computed and shown on the map, and also their positions in relation to the traverse-stations, especially as regards section-corners.

Reference-tubes.

105. At distances of about a mile apart a group of three iron reference-tubes of standard pattern are to be inserted in positions not likely to be disturbed, and be visible from each other, and, where possible, from a trig station.

Railway-crossings.


106. In cases where roads abut upon or cross railway-lines the surveyor must report to the Chief Surveyor, who shall communicate with the District Engineer of Railways on the subject, with the view of arranging for suitable crossings.


*GROUND-MARKING.**Pegging.*


107. All pegs are to be of sawn or split and dressed heart of totara, kowhai, jarrah, blue-gum, kauri, matai, puriri, or hinau, $2\frac{1}{2}$ in. by $2\frac{1}{2}$ in., or, if not procurable, 3 in. by 2 in., and 2 ft. long, driven not less than 18 in. into the ground, a hole having first been made with an iron jumper. In special circumstances the length of peg must be varied—thus, in loose sand or in swamp pegs 3 ft. or more in length may be used; while on public roads, railways, and centre-road traverse, where pegs must be driven flush with the surface, 18 in. pegs or 8 in. iron spikes may be used. The front pegs of sections must have the numbers of the sections and the letter R branded or cut on them; back pegs are also to be branded with the section-Roman numerals, the letter R, and the broad arrow; ranging-pegs with corners should be marked with a distinctive mark, and a description of the tree, with its bearing and distance from the corner, noted in the field-book. Pegs shall be inserted and lockspits made in open country at the intersection of the boundaries of sections with every road, large stream, or path in positions likely to be seen by the public; and in standing forest iron pins, 15 in. long and $\frac{1}{4}$ in. diameter, shall be driven alongside every corner peg. All traverse-pegs should be centred with a tack, and all pegs split in driving must be replaced.


Trenches and Lockspits.

108. In open country, wherever possible, all pegs shall have trenches dug, as shown below:—

At adjacent section-frontages, thus: 

At traverse boundaries, thus: 

At corners of isolated (spotting) sections, thus: 

On road-lines, thus: 

In all cases commencing 2 ft. from the peg.

The trenches to be of the following dimensions:—

- (a.) At corners of survey blocks—6 ft. long, 15 in. wide, and 12 in. deep.
- (b.) At corners of isolated sections and at the ends of lines over 80 chains in length—4 ft. long, 12 in. wide, and 10 in. deep.
- (c.) At all road, ranging, and corner pegs other than as above—3 ft. long, 9 in. wide, and 9 in. deep.

In town and suburban surveys trenches will only be required at the corners of each block of subdivisions.

[NOTE.—Where trenches cannot be dug and stones are available, the peg should be packed round with stones, and the direction of the lines should be indicated by short lines of stones.]

*RESERVES UPON CROWN LANDS.**Frontages of Lakes, Seas, Rivers, &c.*

109. There is to be reserved from sale or other disposition a strip of land not less than 66 ft. in width along all high-water lines of the sea and of its bays, inlets, or creeks, and along the margins of all lakes exceeding 50 acres in area, and along the banks of all rivers and streams of an average width of not less than 33 ft., and, in the discretion of the Commissioner of Crown Lands, along the bank of any river or stream of less width than 33 ft.

School-sites.

110. Suitable school-sites of about 10 acres each are to be reserved where required.

Bush and Timber.

111. Bushes in sparsely timbered country and areas in forest country containing milling or valuable timber are to be reserved.

Gravel or Road-metal.

112. Areas in suitable situations and distances apart where rocks outcrop or gravel-beds are exposed are to be reserved to provide stone, gravel, and sand for roadmaking purposes.

Tops of Wooded Hills.

113. The tops of all high ranges, when wooded, more especially at the sources of streams, are to be reserved.

Sites to be recommended for Reservation.

114. The following sites are to be recommended for reservation in suitable localities:—

- (a.) Camping-sites for stock, in suitable situations on main or other roads;
- (b.) Places of historical and of scenic interest;
- (c.) Outcrops of building-stone, coal, or other minerals;
- (d.) Sites for rifle ranges adjacent to towns, villages, and railway-lines;
- (e.) Reserves for all or any of the purposes mentioned in section 321 of the Land Act, 1908.

The specific purpose of each reserve shall be written on the plan.

PART III.—SURVEYS OF NATIVE LANDS.

Foregoing Regulations apply.

115. The foregoing regulations apply equally to the survey of Native lands for any purpose whatsoever, and, in addition thereto, the following regulations are to be observed.

Boundary-lines to be cut.

116. All boundary-lines of original blocks shall be distinctly marked on the ground by lines cut through all vegetation above 2 ft. in height, and must also be thoroughly pegged, observed, and measured. Subsequent subdivisions may, in the discretion of the Chief Surveyor, be marked in the same manner as sections of Crown lands, except in the case of poor and remote lands, when the Chief Surveyor may modify these requirements.

Boundary-lines, General.

117. When triangulation is available for ascertaining distances it will not be necessary, provided the Chief Surveyor consents, to chain long lines if the crossings of streams, ridges, or other natural features are fixed by intersections; but the crossings over ridges must be cut and cleared and well pegged with direction pegs. Where a boundary-line abuts on a stream, lake, or coast-line, the length of such line, as well as the traverse-length, must be supplied. Swamp or terrace boundaries are inadmissible; they must be shown by right lines.

Features and Roads.

118. The positions of all remarkable hills, ridges, pas, eel-weirs, graves, Native cultivations, tracks, battlefields, villages, *rahuis*, boundary-stones, &c., within or near the block under survey shall be correctly fixed, and the courses of rivers, forests, margins of swamps, lakes, coast-lines, or other natural or artificial features shall be delineated in their proper position on the plan. All legal roads traversing a block must be properly surveyed and shown on plan, coloured in burnt-sienna, and in cases where unsurveyed formed roads intersect such a block they shall be surveyed and shown on plan but left uncoloured. Where road-lines have been constituted by Court order and have not been made legal public roads they must be shown coloured pink.

Native Names.

119. The Native names of all boundaries or natural features within or pertaining to the block shall be ascertained, together with the names and positions of adjacent lands, and be shown on the plan.

Mapping.

120. Plans shall be neatly drawn, in accordance with specimens to be seen in any of the Survey Offices, to the sizes and scales given in Appendix G hereto. The whole boundary of the land forming the subject of the claim is to be conspicuously indicated by a tint of permanent red colour carried all round within it, and when islands are intended to be included in the claim they must be distinguished by the same tint. The plan should have a plain title stating the Native name of the block, the survey district, and the land district in which the land lies. The boundaries of the survey districts and blocks, and also the number of the latter, must be shown upon the plan, and in the case of papatupu lands the names of the applicants and of those who pointed out the boundaries.

The scale of the plan, the meridian of the circuit in which the block is situated, and the area shall be plainly shown. In the lower left-hand corner shall be quoted the number, and the date of letter of instructions to the surveyor, and the number of the field-book. The plan shall bear a certificate signed by the surveyor making the survey in the form shown in Appendix K or L hereto, or to the like effect. After examination the plan, if in order, shall be approved by the Chief Surveyor of the district. A copy of the plan, or a mounted cloth tracing omitting survey detail, shall be furnished by the surveyor, to be used for the purpose of the Native Land Court; and payment for the tracing, to be fixed by the Chief Surveyor, will be a charge upon the block. The Chief Surveyor's approval of a Native survey shall include a statement of the date of completion of survey. (See Appendix R.)

No Additions to be made to Approved Plans.

121. Original plans of blocks which have been approved by the Chief Surveyor shall not have further survey work or detail of a permanent character added to them. Subdivisions of such original blocks as ordered by the Native Land Court, or made at the instance of the owners of the land, shall be on separate plans.

Surveyors to be authorized.

122. All surveys undertaken for the purposes of the Court, or for lands dealt with under any Act affecting Native lands, when not done by the official staff, shall be made by licensed surveyors specially authorized by the Chief Surveyor, who shall issue a specific authority in writing in each case.

Adjustment of Areas.

123. When an original area is found on subdivision to be more or less than as stated, either on account of defective prior survey or other causes, the area of the new subdivisions shall be adjusted *pro rata* in every case.

**PART IV.—SURVEYS OF RAILWAYS, ROADS, ETC.,
UNDER THE PUBLIC WORKS AND OTHER ACTS.**

124. Regulations 1 to 103 shall equally apply to surveys and plans of land taken for roads, railways, or other public purposes under the provisions of the Public Works Act or any other Acts wherever they are not inconsistent with the following regulations.

Railway and Road Land Plans.

125. Special instructions issued by the Public Works Department for the preparation of land plans shall be strictly adhered to. (See Appendix O.)

Local Authority to be notified.

126. Road surveys through leasehold and freehold lands are generally initiated at the instance of local authorities, to whom surveyors should give due written notice of the date on which it is proposed to commence the survey, so that the local authority may, if desired, send an officer to inspect the proposed route with the surveyor.

Traverse Connections.

127. The traverse of the survey shall be connected to the corners of the sections or properties through which the road passes and, at intervals not greater than five miles, to the trig. stations of the district. The regulations for ordinary road-surveys, already prescribed, will equally apply in these cases.

Reference-marks.

128. Where no triangulation exists the traverse shall be checked and, if possible, connected at about one-mile intervals to some permanent topo-

graphical feature outside the line of formation, such points to be marked by iron reference-tubes controlled by an independent determination.

Traverse and Plot.

129. The traverse shall generally commence at the same end, and the pegs shall be numbered in the same direction as that of the engineering traverse, if any, and shall be plotted upon drawing-paper of regulation size to a scale of 10 chains to an inch, or to such larger scale as will allow of all necessary details being shown. In the case of railway surveys, for the preparation of land plans the uniform scale of 3 chains to an inch is to be used, and the work must be plotted the length of the sheet irrespective of the north point, and each sheet should contain one mile.

Length of Sides.

130. The lengths of the boundary-lines of the area proposed to be taken shall be given for each separate title, as well as its true position in the property.

Names, Numbers, and Markings.

131. The names of the present owners of properties, wherever they can be ascertained, and the numbers of the sections or subdivisions, blocks, &c., shall be written on each plan; also the area of land taken for the work from each property or separate holding. The ground-marking, pegging, &c., shall be done generally as directed in a previous part of these regulations.

Requirements as to Plan-details.

132. Plans shall be drawn to the sizes and in the colours prescribed for working plans. Boundaries of local bodies' districts shall be edged in light colour, and the name printed in the same colour, each district having different colours. Lands to be taken are to be coloured in different colours for each adjoining property. Roads to be closed to be coloured green. In addition to the plan two copies on unmounted tracing-cloth shall be supplied. The plan is to be certified as correct by the surveyor who made the survey, and also "approved" by the Chief Surveyor of the district in which the land lies, and the title shall state the Act, and the section thereof, under which the land is being taken. (See Appendix M.)

Schedule.

133. An accurate schedule of the land proposed to be taken from each property shall be furnished with the plan in the form shown in Appendix P. In the case of a road-deviation a schedule of the road to be closed shall also be furnished.

PART V.—LAND TRANSFER SURVEYS.

Regulations to apply.

134. The foregoing regulations shall equally apply to surveys made under the Land Transfer Act, 1915, wherever they are not inconsistent with the following regulations, which shall apply specially to surveys made under the Land Transfer Act, 1915. Only a surveyor specially licensed by the Surveyor-General shall be eligible to make such surveys. (See Regulation 4.)

Field-book.

135. Surveyors in private practice shall send in the original field notes of the survey either in a field-book or in loose-leaf form.

Statutory Declaration.

136. Any plan purporting to be a survey, a resurvey, or subdivision of any land is to be signed by the surveyor who actually made the measurements in the field, and shall also be verified by statutory declaration of the licensed surveyor employed to make such survey, in the form given in Appendix N hereto.

Plan to be lodged.

137. Such plan shall be lodged with the District Land Registrar, and sent by him to the Chief Surveyor for approval, and only when so approved shall be deemed to be accurate for all purposes of the Land Transfer Act.

Connection to Standard Survey.

138. Surveys within an area covered by a standard traverse shall be connected to the stations of the standard survey. The surveyor shall use the standard blocks as his initial for bearing, and in all cases he shall start his work from one standard block, continue to a second, and check the bearing on a third block.

Connection to Trig. Station.

139. In districts where there is no standard survey, but a triangulation is available, all surveys of sections or allotments shall be connected with a trig. station or other reliable mark.

Surveys must be closed.

140. Should a property be bounded on one or more sides by natural features of which a retraverse is not required, the survey shall be closed by actual measurements in such a manner as will enable the work to be thoroughly checked. Adjacent standard work and prior surveys shall be connected with.

Irregular Boundaries : Offsets.

141. When an irregular boundary is defined by offsets measured thereto from one or more survey-lines, the surveyor shall show on his plan the distances along such line or lines at which offsets have been taken, and the measured length of such offsets. These may, if intricate, be shown in tabular form. When the line of high-water mark is shown as the boundary of a lot a report is required showing how the high-water-mark line was defined.

Surrounding Rights.

142. Every plan of any survey made under the Land Transfer Act shall exhibit, distinctly delineated, the natural features within or adjacent to the survey, and sides of roads, streets, passages, thoroughfares, and their widths; also all easements, fences, squares, and reserves for public use which bound or are adjacent to such survey; and also show all blocks and allotments into which the land is divided, marked with distinctive numbers and colours. In towns the buildings with their eaves or projecting portions abutting on or which overlap or closely approach the boundaries of adjoining lots shall be shown on the plan, and their position relative to the boundaries clearly specified and delineated, and the actual width of the roads forming the frontages shall be measured as occupied and shown on the plan. (See Plate IV.)

Definition of Boundaries.

143. If the boundary is a wall it must be shown whether it is a party wall, and whether the line runs through the centre or otherwise. The position of all boundary-fences must be shown in respect of the boundary claimed; and the nature of the boundary of the land, whether wall, house, fence, ditch, hedge, stream, or road, should be stated. The position of all traverse-lines relative to such boundaries should be clearly shown, and whether the line measured is inside, outside, or in the middle of the boundary. Swamps, terraces, or irregular fences are inadmissible as boundaries except if so made by the Crown grant, in which case the consent in writing of the adjoining owners should be asked, and these boundaries should, with such consent, be reduced to right lines with defined bearings and distances, and the adjoining owners should sign the plan. Where the reduction to right lines deviates from the title boundary the District Land Registrar should be consulted as to whether he will accept these lines as the original boundary, or will require the alteration to be given effect to by the registration of cross-transfers.

Title by Possession.

144. When a title is claimed by "possession" it will be the duty of the surveyor to endeavour to obtain information in respect of occupation, such as walls, fences, buildings, &c., which he finds upon the ground, and the age of same; and if such boundaries are departed from, the reasons for so doing should be noted on the plan.

Original Points unchangeable.

145. The actual measurements made in the field must be given, notwithstanding that they may not agree with the Crown grant, public map, or deposited plan, and should the difference be material, the measured distance and bearing to the next adjoining or to other Crown grant or title boundary, as the case may require, shall be furnished, in order to determine whether there is any real encroachment, or whether the differences arise from former defective surveys. And in dealing with this subject the surveyor must adhere to the principle of the unchangeableness of original lines and corners established by Government or other duly authorized surveyors done in good faith; in other words, where the lines and corners are originally established on the ground by a proper officer, in pursuance of the survey system ordered by the law of the time, they must be regarded as the true lines and corners which they represent, even if subsequent surveys indicate that the posts, pegs, or marks are out of line, and that the corners are out of position according to the original description thereof.

Surveyors should also bear in mind that, possession being *prima facie* though not conclusive proof of title, the District Land Registrar cannot usually issue a title to land held in adverse possession.

Pegging and Marking.

146. Where wooden pegs cannot be driven, as in cities, iron bolts of $\frac{1}{2}$ in. diameter and 12 in. length, or 12 in. iron spikes, are to be used as pegs, and should be shown on plan by a small blue circle. Wherever possible, pegs must be inserted on the boundary; but in the case of stone or rubble walls and suchlike obstacles they may be placed parallel to, and at stated distances from, the true boundary.

Colouring.

147. Roads, streets, and public rights-of-way are to be coloured with burnt-sienna; railways, red; edge of land to be dealt with, green; natural features (when boundaries) with sepia; newly created roads or streets in pink.

Where the land forms a part of two or more original sections the boundaries and numbers of such sections shall be shown by a distinguishing colour, and should the boundaries on the ground differ materially from the Crown-grant boundaries, such Crown-grant boundaries shall be shown by dotted black lines.

Names, &c., to be shown on Plan.

148. For bringing land under the Act the plan shall show on the face of it the district, block, section, town, or other designation as the case may require, including the name of the district of the local authority within which the land is situated, with the names of the owners or occupiers of the land represented by the plan. The same information in respect to adjoining lands shall also be shown. In subdivisions of land already under the Act the names of adjoining proprietors are not required, but the numbers of previous deposit plans must be given.

Owner to sign Plan.

149. All plans shall be signed by the proprietor of the land in each case, or by his lawfully authorized attorney or agent.

PART VI.—SURVEYS OF TOWN LANDS.

Definition of a Town.

150. "Town," as defined in the Land Acts, means "any parcel of land outside a borough or town district divided into areas for building purposes," and may include allotments of any size, provided that they are intended for building or residential purposes only, and not for the purpose of making a living from the land.

Selection of Town-sites.

151. When a town-site is chosen by the surveyor the location of a future city has perhaps been decided, and, as the health of the people is a supreme law, it is essential that the site chosen should present such natural features and advantages as will conduce to the well-being of the future inhabitants.

Elevated sites should be chosen, as not being liable to be flooded by the overflow of watercourses, nor kept damp by soakage waters, and, moreover, the inclination from elevated sites towards lower levels provides for drainage.

Pervious subsoils present favourable economic conditions in that they are easily excavated for underground subways, water, gas, and sewage conduits, as well as being healthier sites for towns than those on impervious soils.

Surveyors should therefore, in the selection of town-sites, exercise wisely their judgment as between flooded lands and more elevated situations safe from flood; between clay flats and permeable strata, and the dangers lurking in perennial moisture.

The matter of the water-supply for the future town or city should receive due attention, any existing natural provision being reserved or its reservation recommended.

The probable extent of population and settlement must be also duly considered, and provision made for future extension and requirements.

The location of a town-site should preferably be at the junction of main lines of roads giving access to the surrounding country, and with exit by main road or railway to a seaport. Facility of movement between the town and the surrounding country and neighbouring cities is essential.

In new country the surveyor should therefore have regard to possible future lines of communication, as the principal streets should form a part of the trunk system of the territory in which the town is located.

Designs to be submitted.

152. In every case where allotments or sections or blocks of land outside of a borough or town district are to be sold or advertised for sale as a town, whether public or private, a plan of such town, signed by the owner, to the sizes and scales given in Appendix G hereto, showing the proposed arrangement of allotments and streets, and accompanied by a detailed report, shall be submitted by the surveyor to the Chief Surveyor, and by him referred, with his report, for the approval of the Minister of Lands prior to sale.

New Towns to be named.

153. The plan of the design of a new town shall show the proposed name; if the selected name is already in use elsewhere another name shall be proposed.

The names of the streets shall also be shown on the plan of the design. A subdivision adjacent to an existing town shall be named as an extension thereof, with its number.

Details on Plan of Design.

154. On the plan of the design shall be shown the area to be included, edged green; proposed new streets or widenings, coloured pink; existing roads or streets, coloured sienna. Grades shall be shown on streets, and approximate contour-lines shown over the whole area. Widths of streets, linkages of street frontages, areas and numbers of allotments and blocks shall be shown all in black, and there shall be a scale and a locality plan. The above details and method of numbering allotments and blocks are shown on plan, Plate III.

Width of Streets.

155. The principal streets shall be $1\frac{1}{2}$ chains wide; other streets 1 chain wide, unless under special circumstances. Streets less than 1 chain wide will be permitted with the consent of the Minister of Lands; but on such streets the building-line shall be shown set back 50 links from the centre-lines.

Location of Streets.

156. Streets, where practicable, shall be located on the lower levels, on lands that are fairly level, and follow the contour of the surface on uneven ground in such manner as to facilitate a drainage scheme for the town.

Street-corners to be cut off.

157. At the intersection of street-corners, especially in the case of main streets, it is advisable to cut off the corners, and it is recommended that intersections containing an angle less than 135° shall be cut off by a short line, which will be the boundary of the street, drawn from points on the street frontages distant not less than 20 links from the intersection of the street boundaries.

Gradients of Streets.

158. Wherever possible gradients on the principal streets shall be limited to 1 in 20, and on cross-streets not steeper than 1 in 15. In streets less than 1 chain wide steeper gradients may be permitted with the consent of the Minister.

Esplanade.

159. Where a town is situated on a river or on the seashore an esplanade of a suitable width shall be reserved along its frontage.

Wharf-sites.

160. Provision shall be made for wharf-sites on the banks of navigable waterways within a town boundary.

Reserves in Private Towns.

161. In the case of a subdivision of land as a town by a private owner not less than 5 per cent. of the area of the allotments shall be reserved for public purposes. On the plan these areas shall have their specific purpose written on each. In cases where the area subdivided is small the 5-per-cent. reservation may be exempted with the consent of the Minister of Lands.

Details required on Plan of Private Town.

162. The owner's name and those of adjacent owners shall be written on the plan, and the total area under subdivision shall be stated. The plan shall be approved by the local authority before submission to the Minister of Lands.

The surveyor shall state that he has considered and provided for drainage requirements. At the lower right-hand corner of the plan space shall be left for the Chief Surveyor's and the Surveyor-General's recommendation and for the Minister's approval.

Alteration to an Approved Scheme.

163. When an approved scheme is subsequently to be altered in any manner the alteration shall be submitted for approval, and the original scheme shall be cancelled by the Minister for such part of it as is to be altered.

Reserves for Public Purposes on Crown Lands.

164. Reserves for public purposes suitable to all towns, such as are enumerated in section 321 of the Land Act, 1908, are to be recommended. On the plans these areas to have their specific purposes written on each, either in full or in abbreviated form. The undermentioned reserves shall be laid off as directed hereunder:—

(a.) *Cemetery Reserves.*—The cemetery must be outside the town limits; as a general rule the distance should not exceed two miles from the probable nucleus of town settlement. The position should be remote from the noise and interruption of traffic, but easy of access; the site should be elevated, and not in close proximity to a watercourse; the soil should be friable, and should be tested by digging a pit at least 6 ft. deep, such pit to be shown on plan.

(b.) *Recreation Reserves.*—Open spaces shall be set apart and reserved for recreation-grounds, the number of such reserves being regulated by the superficial area of the town, being not less than one-tenth of such area, the separate size of such reserves in no case being less than $12\frac{1}{2}$ square chains. The superficial area means the area divided into town sections, and the necessary streets to give access thereto.

(c.) *Municipal Reserves, &c.*—Municipal reserves shall be made at the rate of 1 acre to every 10 acres of the saleable area of the town; also one or two school-sites of not less than 2 acres each. There shall also be laid out sufficient land, either outside or inside such towns, for sites for depositing nightsoil, dirt, and rubbish, and such sites shall be selected on such side of the said towns as shall be opposite to the quarter from which the prevailing summer wind blows; also sufficient land, either outside or inside such towns, for sites for gravel-pits and stone-quarries, and for depositing gravel, stone, or other materials required for making and repairing roads within such towns, provided that gravel, stone, or other road materials are obtainable in the locality.

Allotments to be Rectangular.

165. As far as is practicable the allotments shall be rectangular, the side boundary-lines being at right angles to the street-lines.

Size of Allotments.

166. In public or private towns every allotment should contain not less than one-fifth acre, and the street frontage shall not be less than 40 ft. These dimensions may be modified with the consent of the Minister.

Setting back Frontages.

167. In subdivisions requiring frontages set back in terms of the Public Works Act, 1908, the centre of the original street shall be shown by a dotted red line, with particulars of how its position has been determined.

Standard Monuments.

168. In addition to the pegs at the corners of the allotments, stone or concrete blocks, or iron tubes, all provided with fine centre-marks, shall be placed at intersection of street-lines about 10 links from and parallel to the building-lines, and so that those adjacent shall be visible from each other. On these standard lines the angular and lineal measurements of the town are to be based.

Scheme of Streets.

169. On land that is fairly level the scheme of streets, as a general rule, shall consist of two systems of parallel streets at right angles to each other, and a third system radiating from a central position, such as a railway-station; but on uneven ground the scheme of the streets should be laid out to some extent in accordance with the surface conformation.

The distance between the main lines of parallel streets may be from 4 to 6 chains between centres, and the cross-streets shall intersect at right angles at distances not greater than 11 chains between centres.

The residential area shall be kept distinct from the business and industrial centres.

Appendices.—Forms to be issued.

170. The forms and appendices hereafter set forth shall be used for the purpose of the foregoing regulations in the several cases to which they are applicable, and shall be deemed to be part of the said regulations, and may be modified in each case as the circumstances require.

APPENDICES.

APPENDIX A.

[Regulation 2.]

It is essential that surveyors should be conversant with the following Acts of Parliament:—

- (1.) Acts Interpretation Act.
- (2.) Land Act.
- (3.) Native Land Act.
- (4.) Land Transfer Act.
- (5.) Mining Act.
- (6.) Counties Act.
- (7.) Municipal Corporations Act.
- (8.) Public Works Act.
- (9.) Surveyors' Institute and Board of Examiners Act.
- (10.) Land for Settlements Act.

These Acts were consolidated in 1908. The amendments brought down to the end of the year 1922 are given in the 1923 "Index to the Laws of New Zealand," by E. Y. Redward.

There is a "Digest of Land Laws," by W. R. Jourdain, containing amendments to March, 1921. The Digest and Supplement can be obtained from the Department of Lands and Survey.

"The Theory and Practice of Surveying," by Johnson and Smith, contains an appendix on the "Judicial Functions of Surveyors," which is useful when redefining prior surveys.

Another useful book for the surveyor is John Weingarth's "Identification Surveys," published by the New South Wales Institution of Surveyors.

APPENDIX G.

[Regulations 48, 120, 132, and 152.]

SIZE AND SCALE OF PLANS.

The following are the scales and sizes to be used:—

Working Plans.

	Chains to an Inch.
Town sections, or sections under half an acre ..	1, 1½, 2
Suburban sections	3, 4, 5
Rural sections	10
Minor triangulation	40
Topographical	40

Working plans of minor triangulations or block and section surveys are to be drawn on Whatman's best hand-made mounted antiquarian drawing-paper cut to 30 in. square. Isolated sections may be drawn on sheets 18 in. by 16 in.

Land Transfer Plans.

	Chains to an Inch.
1 to 10 perches, not less than	½
10 to 20 perches, not less than	1
20 perches to 1 acre	1 to 2
1 acre to 10 acres	3 to 5
10 acres to 50 acres	5 to 10
51 acres to 3,000	10
3,000 acres and over	20

Land Transfer surveys are to be plotted on similar mounted paper, and must measure 30 in. by 30 in. or 20 in. by 20 in.

Native Land Court Plans.

Scales as for working plans, but not less than 10 chains to an inch; and in every case a space of at least 100 square inches must be left clear of any survey-detail for recording the notes and decisions of the Court.

Native Land Court surveys should be delineated on similar mounted paper, and (except with special permission) should be 30 in. by 30 in. or 18 in. by 16 in.

Note that the Land Transfer protractor size, 20 in. by 20 in., is not to be used for Survey Office plans of Crown or Native land.

APPENDIX J.

[Regulations 64, 120, 132, 147, and 154.]

COLOURS.

Colours are used on surveyors' and departmental plans, not for the purpose of improving their appearance, but to convey and distinguish between various classes of information. It is necessary, therefore, that they should be as permanent and lasting, and as distinct, as any other part of the plan.

The following colours have been selected, after tests extending over a series of years, as standard colours, and no others may be used in place of them except when issued by the Department itself as satisfactory substitutes. Artists' colours in cake or moist form, not in liquid-ink form, are intended in every case.

Yellows.—Aureolin; Azo yellow; cadmium yellow; cadmium orange.

Reds.—Madder-carmin; alizarin scarlet; cadmium red.

Blues.—Outremer (French ultramarine); sapphire blue; Prussian blue; ultramarine ash.

Violets.—Azo violet; permanent violet (and Phœnician red for temporary maps only).

Greens.—Opaque oxide of chromium; viridian; cadmium green; freehold green.

Browns.—Burnt-sienna; burnt-umber; sepia.

Grays.—Charcoal gray; hill-gray cool; hill-gray warm.

White.—Chinese white, in tubes only.

Blacks.—Indian ink in sticks only. Chinese ink of approved quality will also be issued.

All the above are permanent colours, and will not bleach out with chloride of lime, &c. The following colours are very fugitive and will bleach as above, but will be issued for use on temporary maps where their property of bleaching is of assistance:—

Crimson lake and carmine lake.

It should be noted that the permanent colour madder-carmin is not the same as carmine lake; although allowed on account of its permanence and beauty, it is not stocked, owing to its expense.

Liquid or waterproof inks are not allowed on working plans for deposit, with the exception of liquid indian ink, on account of their entire lack of permanence. Under test they disappear completely in from a few weeks to a few months.

APPENDIX K.

[Regulations 68 and 120.]

CERTIFICATE BY SURVEYOR.

I, A. B., of [Place of abode], licensed surveyor, hereby certify that this plan has been made from surveys executed by me or under my personal supervision, inspection, and field check; that both plan and survey are correct, and have been made in accordance with the regulations of the Surveyors' Board dated the day of 19 .

Dated at , this day of , 19 .

A. B.,
Licensed Surveyor.

APPENDIX L.

[Regulation 120.]

CERTIFICATE TO BE ENDORSED ON PLANS FOR THE PROCLAMATION OF ROADS THROUGH NATIVE LAND UNDER PART XX OF THE NATIVE LAND ACT, 1909.

I, A. B., of [Place of abode], licensed surveyor, hereby certify that this plan has been made from surveys executed by me or under my personal supervision, inspection, and field check; that the road-line shown upon this plan has not been laid out upon the site of any building, garden, orchard, plantation, village, or burial-ground; that both plan and survey are correct, and have been made in accordance with the regulations of the Surveyors' Board dated the day of , 19 .

Dated at , this day of , 19 .

A. B.,
Licensed Surveyor.

APPENDIX M.

[Regulation 132.]

CERTIFICATE TO BE ENDORSED ON PLAN FOR THE TAKING AND LAYING-OFF OF ROADS UNDER SECTIONS 14, 213 (c), AND 234 (2) OF THE LAND ACT, 1908.

1. I, A. B., of [Place of abode], licensed surveyor, hereby certify that this plan has been made from surveys executed by me or under my personal supervision, inspection, and field check; that both plan and survey are correct, and have been made in accordance with the regulations of the Surveyors' Board dated the day of , 19 .

2. That I have taken and laid off the road coloured on this plan, and marked to , under the authority of a Warrant dated the day of , 19 , and issued by the Governor-General pursuant to section of the Land Act, 1908.

3. That notice of the intention to take and lay off the road was duly served on the lessee [or licensee] and all other persons having any known interest in the land.

APPENDIX N.
[Regulation 136.]

I, A. B., of [Place of abode], licensed surveyor, do solemnly and sincerely declare that this plan has been made from surveys executed by me or under my own personal supervision, inspection, and field check, and that both plan and survey are correct, and have been made in accordance with the regulations of the Surveyors' Board dated the _____ day of _____, 19____.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the Justices of the Peace Act, 1908.

APPENDIX O.
[Regulation 125.]

In preparing land plans for the Public Works Department the following instructions must be strictly adhered to :—

1. In the case of railway surveys the uniform scale of 3 chains is to be used except for necessary enlargements showing details. The work is to be plotted lengthways of paper, irrespective of north point, from left to right, and advancing in accordance with the engineering-survey chainage. Each sheet is to commence and end, if possible, at a mile-peg, thus containing an even mile.

2. The engineering-survey chainage is to be shown on each sheet in red, each chain-peg to be marked and every tenth peg numbered, the original marks to be adhered to, and any discrepancies to be shown as long or short chains. Where, on account of defective original survey or of deviations subsequently decided on, the length of the engineering survey is incorrect, there shall also be shown on each sheet, in black or blue, at every 10 chains, the correct through mileage from the commencing-point. The exact relationship between the land-plan-survey chainage and the engineering-survey chainage shall be clearly indicated at intervals of not more than half a mile. The surveyor will require, to the extent necessary for the completion of the land-plan survey, to restore the original centre-line pegs of the railway survey, including the tangent and intersection or tie-line pegs. In all cases intersection pegs, or tie-line pegs if the intersection pegs be inaccessible, must be marked by iron tubes of standard pattern. Where necessary the curves are to be computed in the same manner as for the engineering survey.

3. Lands to be taken are to be coloured in different shades or colours for each adjoining property.

4. Where land is taken from two or more sections or subdivisions belonging to one owner, the area taken from each section or subdivision must be stated, and each section coloured distinctively.

5. The name of the survey district and the number of the block in such survey district must be given on each sheet, and the block or survey-district boundary must be indicated by the respective conventional dotted lines adopted for that purpose by the Survey Department, and marked "Block" or "Survey-district boundary," as the case may be. The name of the local body in whose district the land lies is also to be stated, and the boundaries of such districts are to be shown if coming within the plan.

6. When Crown land is taken for a railway or a ballast-pit, &c., such land should be described as "Crown land," and not "railway reserve," "ballast reserve," &c., unless it has been actually reserved for such purpose by *Gazette* notice.

7. All existing roads that are to be left open for the use of the public, whether crossed by railway or not, must be coloured burnt-sienna.

8. If any part of a road crossed by a railway is to be closed to the use of the public and occupied exclusively by the railway, the portion to be closed must be coloured green, and the area must be stated.

9. Land required to be taken for new roads, such as approach roads to railway-stations, or road-deviations rendered necessary by existing roads being closed by railway-works, are to be coloured sepia or orange; or, if

portions of such new road or deviation are taken from adjoining sections, then each area so taken from each section shall be coloured alternately sepia or orange.

10. The use of burnt-sienna, sepia, orange, and green must be restricted to the cases above mentioned.

11. No private crossing on railways to be distinctively coloured or shown in any way.

12. Plans to be in duplicate, one copy to be prepared on mounted drawing-paper and one copy to be on mounted tracing-cloth.

13. The regulations of the Survey Department to be observed except where herein varied.

14. Land plans, or portions thereof, with all necessary explanatory data when completed, should be forwarded to the Head Office, through the local office of the Department, before being submitted to the Chief Surveyor for approval. On receipt of the plans, or any portion of same, at this office, a progress-payment of 50 per cent. of the value of the work done will be made; and after the whole of the plans have been approved by the Department and by the Chief Surveyor the final payment will be made.

APPENDIX P.

[Regulation 133.]

LAND REQUIRED FOR TO BE TAKEN UNDER SECTION OF
THE
Schedule.

The several parcels of land mentioned in list hereunder :—

Approximate Area of each of the Parcels of Land required to be taken.	Being Section, or Portion of Section, No.	Situated in Block	Situated in Survey District of	Shown on Plan marked	Coloured on Plan	Registration District of	Situated in the Borough, Road District, or County of *†
A. R. P.							

Licensed Surveyor.

Date :

Examined and found correct :

Chief Surveyor.

Date :

All in the Land District of ; as the same are more particularly delineated on the plan [or plans] marked , deposited in the Head Office, Department of , at Wellington, in the Land District of Wellington, and thereon coloured as above mentioned.

* The heading herein to be altered to suit the requirements of each case by striking out such portions as do not apply and adding anything further which may be requisite.

† Here insert name of local body.

APPENDIX Q.

[Regulation 86.]

ASTRONOMICAL CHECK.

Azimuth may be determined by either solar or stellar observations.

A professional paper by Thomas Humphries, F.R.A.S., under the title of "Directions for testing Traverse Bearing by Observations on Circumpolar Stars with Five-inch Transit Theodolite," is published by the Department of Lands and Survey.

Computation forms for facilitating the numerical work by a systematic arrangement of the formulæ of a star at elongation are obtainable at each of the district offices from the Chief Surveyor.

W. T. NEILL,

Chairman of Surveyors' Board and Surveyor-General.

W. C. SMITH,

Secretary, Surveyors' Board.

Signed at Wellington this 20th day of March, 1923.

In pursuance of the provisions of subsection two of section seventeen of the Surveyors' Institute and Board of Examiners Act, 1908, His Excellency the Governor-General of the Dominion of New Zealand, acting by and with the advice and consent of the Executive Council of the said Dominion, doth hereby approve of the foregoing regulations.

JELLICOE, Governor-General.

Approved in Council this 25th day of June, 1923.

F. D. THOMSON,

Clerk of the Executive Council.