Alberta
TRANSPORTATION

Highway

Pavement Marking

Guide

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(2nd Edition)

FOREWORD TO THE SECOND EDITION

The purpose of the Highway Pavement Marking Guide is to promote uniformity in the application of pavement markings on rural and urban highways in Alberta.

The following second edition of the guide consolidates numerous changes and additions made to the document since the first edition was published in 1999.

In 2000 Alberta Transportation took responsibility of specific highways within cities. The addition of these new highways has prompted the need to review the existing policies and practices covering the use and placement of pavement markings in urban areas. As a result, best practices for urban markings were developed and incorporated into the Highway Pavement Markings Guide.

Over the last three years changes to pavement markings have occurred at the national level improving traffic operations at railway crossings and merge areas of passing/climbing lanes. Subsequently, the national practices were integrated into the provincial standards describing the use of pavement markings at these roadway components.

This has also been the opportunity to include other changes, which in the opinion of those involved in highway operations had a potential to improve safety and traffic operations and contribute to greater uniformity in application of markings across the province. The guide has been enhanced to include improved method for establishing No-Passing Zones, the criteria for selecting markings at pedestrian crossings, guidelines for the application of word markings, and standards for treatment of access points and Type I intersections.

The guide will continue to evolve, as new standards are developed in response to continuing research and changing operational conditions and the need to adopt to these conditions through the effective and economical application of uniform and improved pavement marking standards.

Feedback is essential for regular updating of this guide and pavement marking standards in general. Comments may be sent to the Traffic Operations Specialist of the Maintenance, Specifications and Traffic Engineering section of Alberta Transportation, 4999-98 Avenue, Edmonton, Alberta, T6B-2X3.

The second edition of the Highway Pavement Marking Guide can be viewed on the Alberta Transportation web site (www.trans.gov.ab.ca). New information, and/or updates will be incorporated into the electronic (web) edition of the guide.

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AMENDMENT

During the publishing of the Highway Pavement Marking Guide, it became apparent that there are a few minor inconsistencies on several drawings in the guide. Specifically, on multi-lane divided highways a yellow line on the inner shoulder should be considered an edge line not a directional dividing line. This is consistent with markings shown in Figure TCS-C-201.

The amendment affects 15 drawings in section C5 *Intersection Markings* and section C6 *Interchanges.* These drawings are*:* TCS-C- 205, 505.5, 510, 510.1, 510.2, 510.3, 510.4. 601, 605, 610, 615, 620, 625, 630 and 635.

Revisions to the drawings will be included in future update of the guide.

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C1. General Aspects

C1.1 Introduction

Markings on the pavement are a major element in any system of traffic control. Pavement markings serve a variety of functions, including:

- lane definition
- separation of opposing flows
- passing control
- lane usage and designation
- pedestrian crosswalks
- stop lines
- parking areas
- word messages.

The motoring public depends heavily upon pavement markings for guidance, vehicle positioning and information. Unless pavement markings are clear, consistent and uniform in their application, drivers may become confused and uncertain of their purpose.

Pavement markings are often used to supplement the regulations or warnings of other traffic control devices, such as traffic signs or signals. Sometimes they are used alone to convey regulations or warning, which would not be obtainable by other traffic control devices.

Under favorable conditions, pavement markings convey information to the driver without diverting the drivers attention from the road. However, they have limitations: they may be entirely obliterated by snow; they may not be clearly visible when wet; and they have limited durability.

C1.2 Purpose

The purpose of this manual is to establish guidelines for the consistent and standard application of pavement markings for both rural and urban highways in Alberta.

The Alberta Highway Pavement Markings Guide supplements the Manual of Uniform Traffic Control Devices for Canada and other guidelines on traffic control devices published by Alberta Transportation.

C1.3 Jurisdiction

These standards shall be used for roadways under the control of Alberta Transportation, and may be used as a guideline for municipalities within Alberta.

C1.4 Installation

All pavement markings must conform to the standard requirements outlined in these guidelines. These standards include the details of the markings such as the line width, length or a marking pattern and the placement criteria.

On certain occasions it may be necessary to install pavement markings that do not conform to the standard requirements included in these guidelines. In such instances, the non-standard pavement markings will need to be approved by the Director of the Maintenance, Specifications and Traffic Engineering Section of Alberta Transportation.

All necessary pavement markings must be installed before any new highway or a temporary route is open to traffic.

When installing pavement markings, reference should be made to the requirements outlined in the latest edition of the Standard Specifications for Highway Constructions, section 7.2 *Painted Roadway Lines* and section 7.3 *Painted Pavement Messages*.

C1.5 Maintenance

All markings should be maintained in legible condition within practical limits. This necessitates a continuing program of striping, curb marking and re-marking lines, words and symbols to revitalize the markings.

It is desirable, in the interest of uniformity, that these markings be maintained in the best possible condition so that they provide the specified colour and patterns for both day and night operations.

Pavement markings should be re-marked on a regular basis dependent upon the degree of wear to which they are subjected. The frequency of re-striping and re-marking is dependent upon the amount of traffic passing over the markings and on the durability of the materials used. Re-marking programs should be based upon these factors rather than a set time period for replacing all markings.

A maintenance program should be established to monitor the performance of markings throughout the entire service life. Before such a program is initiated, the maintenance criteria should be established. These criteria may be based on the remaining service life of markings, retroreflectivity values etc.

The maintenance program typically consists of the following components:

- **Inspections**

  Periodic inspections made after installation of the markings. These inspections should be planned at regular intervals throughout the entire service life of the markings. The inspections should be conducted during daytime and nighttime conditions.

- **Maintaining an Inventory**

  A record of the existing pavement markings may be maintained using a computer database system or a photolog. Such record may include the type of markings, their location and the material used. An inventory of markings is a useful tool, which may assist in determining any deficiencies or operational or safety problems.

- **Maintenance Techniques**

  Maintenance techniques may include:

  - cleaning of surfaces stained by tire tracks, oil drippings
  - replacement of delineation material removed or paved over during roadway repair work
  - replacement of materials removed during snowploughing.

Maintenance of pavement markings should be done in accordance with the requirements included in the latest edition of the Highway Maintenance Specifications, section 53.20 *Painted Roadway Lines,* section 53.21 *Painted Pavement Markings*, section 53.22 *Permanent Pavement Markings* and section 53.24 *Raised Pavement Markers.*

C1.6 Removal

Pavement markings, which are no longer applicable must be obliterated or removed to avoid possible confusion to motorists. Such removal or obliteration must take place as soon as feasible and practical.

Typically, pavement markings are removed with the use of the following methods:

- sandblasting
- grinding
- chipping

Other less common methods of removing markings include application of high pressure water jet or hot compressed-air burning.

Other methods may also be appropriate as long as the removal of markings is permanent. Temporary techniques such as the use of black paint or bituminous solutions should be avoided since the covering material may be susceptible to wear causing the invalid markings to reappear.

Pavement markings must be replaced when they are damaged or when they are not clearly visible. They are normally restored with an overlay of material with similar properties.

C1.7 Materials

The most common method of applying pavement markings is by spray painting. Other alternative methods include the use of more durable products.

Night visibility is achieved with the use of glass beads or spheres embedded in the paint to produce a retro-reflective surface, which causes the markings to appear luminous under night driving conditions.

When selecting and supplying painting materials, reference should be made to the requirements outlined in the latest edition of the Standard Specifications for Highway Construction, section 5.20 *Supply of Line Painting Materials*.

C1.7.1 Paint Systems

Paint is a mixture of a binder (base material) pigment (for colour), retroreflective glass beads and a carrier. Paint can be hot-applied or cold-applied. The average drying time of a paint system ranges from 30 seconds to 10 minutes.

Alberta Transportation uses the following two types of paint:

- **Alkyd Paints**

Alkyd paints are the most common and the cheapest types of paint presently available.

Alkyd Paints are suitable for all types of pavement marking applications. In Alberta, these paints are generally used for the longitudinal and transverse markings.

The disadvantage of using alkyd paints is that during applications, they release volatile organic compounds (VOCs) which are considered an environmental hazard.

The drying time for alkyd paints is longer than the drying time for water-based paints. Alkyd paints are also the least durable.

- **Water-Based Latex Paints**

Service life of water-based latex paints is comparable to a service life of alkyd paints.

These paints are also inexpensive. The main advantage of using water-based latex paints is that they contain significantly less lead-based pigments and organic compounds (VOCs).

The water-based latex paints typically have shorter drying times. They also result in less colour durability as compared to alkyd paints. The minimum temperature in which waterborne paints can be applied is typically 10 degrees Celsius.

Waterborne paints have been used in Alberta for the last couple of years. When the environmental regulations regarding reducing solvents in paints become effective in Alberta, there will be an increased usage of waterborne paints.

- **Epoxy Paints**

Epoxy paints consist of 100% solids. The material is heated, and it bonds with the pavement through chemical reaction. The material is applied within a temperature range of 15 degrees Celsius to 45 degrees Celsius.

Two-component epoxy paints have the longest service life of all paints. The disadvantage of using epoxy paints is that they suffer color degradation and eventually fail due to lack of ultra-violet stability.

They have relatively high cost in comparison to water-based and alkyd paints. They also have the longest drying times, which may reach up to several hours in cold weather.

- **Service Life of a Paint System**

Most paints have a service life ranging from six to twelve months. The length of a service life of a paint system depends on many factors including the type and conditions of the pavement surface, the climate, daily traffic volumes and traffic composition (percentage of heavy trucks).

Service life of a paint system applied to a low volume collector road can extend to two years whereas the service life of the same paint system applied to a high volume expressway may be reduced to three months.

C1.7.2 Durable Pavement Materials

The main advantage of using durable marking materials is their long service life. Although, these materials have higher initial cost, they typically last many times longer than painted markings. They have also been observed to have relatively high resistance to abrasion from snow removal equipment and materials.

Durable pavement markings are often considered a viable and cost-effective alternative to painted markings. They are particularly suitable for locations where durability and long service life is a prime concern (e.g. high traffic volumes, high speed environment, bridges, tunnels etc).

The following four types of durable materials are presently used by Alberta Transportation:

- **Thermoplastic Materials**

Thermoplastic materials are a mixture of plastic, pigment, binder and filler and retroreflective glass beads. They contain 100 percent solids.

The two most commonly used thermoplastic materials include alkyd-based and hydrocarbon-based materials.

Thermoplastic materials are applied by hot extrusion, which require two to ten minutes of drying time. Thermoplastic materials may also be applied by using a hot spray, which takes less than one minute of drying time.

Thermoplastic materials require high temperature for application, which creates a demand for high level of quality control during installation, maintenance and removal procedures.

Hydrocarbon-based thermoplastic materials are not suitable for transverse markings because they can be dissolved by oil drippings.

- **Methyl Methacrylate (MMA)**

Methyl methacrylate is a two-component cold-curing material consisting of 100 percent solids. It is normally applied by either a spray or extrusion process. During installation procedure, the material is mixed in a static mixer, generating an exothermic reaction. As the material hardens, it bonds with the pavement. The material can be applied within a

temperature range of 4 degrees Celsius to 40 degrees Celsius.

- **Preformed Tape**

The preformed tape system contains resin binder, pigment and fillers with optional glass beads and adhesive.

During installation, the preformed tape is inlaid on freshly-laid warm asphaltic surface. The material can also be applied to the existing pavement provided the surface is clean and free of any debris. If the surface is not cleaned properly before application, causing the dirt or debris to accumulate under the tape, adhesion failure is likely to occur.

Preformed tapes can be applied to bituminous or concrete surface, however, they have been observed to perform better on bituminous surfaces. A primer is mandatory on concrete surfaces.

The preformed tapes are classified based on their service life into permanent and temporary tapes.

Permanent tapes are made of urethane or pliant polymer. The material is normally supplied in rolls or sheets, which have thickness ranging from 0.75 mm to 2.5 mm. The tape system is typically provided with a pressure-sensitive adhesive backing.

Preformed tapes are suitable for locations where durability is a prime concern and where only small quantity of marking material is required.

The installation the preformed tapes is relatively easy and require little effort, which makes the material particularly suitable for locations where frequent replacement is necessary due to heavy use of the pavement surface. Preformed tapes have high initial cost and should only be considered in limited circumstances.

- **Regular Epoxy**

Regular Epoxy is a two-component cold curing material consisting of 100% solids. It is spray applied either through a static mixer or by impingement.

Regular epoxy forms a chemical bond as the two components cure. Cure times range from 10 min to 1 hour depending on atmospheric conditions. It can be applied to a minimum temperature of 5 degrees Celsius.

Once cured, these materials are impervious to road chemicals, UV rays or any oil/solvent based products.

- **Polymer Epoxy**

Polymer Epoxy is a two-component cold curing material consisting of 100% solids. It is spray applied either through a static mixer or by impingement.

Polymer epoxy forms a chemical bond as the two components cure. The nature of the polymerized bond greatly increases its bond strength and hardness. Cure times range from 20 min to 2 hours depending on atmospheric conditions. It can be applied to a minimum temperature of 5 degrees Celsius.

Once cured, these materials are impervious to road chemicals, UV rays or any oil/solvent based products.

- **Service Life of Durable Materials**

Durable materials have longer service life than paints. The length of a service life depends on the type of the material used, surface type, roadway operational conditions and climatic conditions. A typical service life for thermoplastic materials ranges from two years to the life of the asphalt and for methyl methacrylate a service life ranges from two to ten

years. Preformed tapes last from two years to four years.

C1.7.3 Pavement Material Selection

Several factors need to be considered when selecting suitable material type for pavement markings. These factors are:

- traffic volumes and traffic composition
- type of roadway surface
- regional climatic and weather conditions
- functional classification of the roadway
- life-span of the roadway or a roadway facility (permanent versus temporary construction)
- material durability/retroreflectivity.

All the above factors will either directly or indirectly affect the marking's visibility and durability as well as application technique. The material selected for pavement markings also must provide the specified colour throughout its service life.

An economic analysis using a life–cycle stream of benefits and costs should be undertaken to determine which material type is the most cost-effective option for the given set of roadway, geometric, operational and capital investment conditions.

Some factors to consider in the economic analysis include:

- initial capital cost of the investment including material cost, cost of installation etc.
- maintenance costs and other costs that may be incurred during a life-cycle
- the life span of the roadway and the material
- regional cost factors
- safety impact and liability issues.

It is desirable that an economic analysis be based on the principles included in the departmental Benefit-Cost Analysis Guide.

C2. Longitudinal Markings

C2.1 Introduction

This section comprises the following sub-sections:

- General Information
- Directional Dividing Lines
- Lane Lines
- Edge Lines
- Continuity Lines
- Pavement Width Transitions
- Passing and Climbing Lanes
- No-Passing Zones.

C2.2 General Information

Longitudinal pavement markings shall conform to the following basic concepts:

- Yellow lines delineate the separation of traffic flows in opposing directions or mark the left edge of the travel lane of divided highways and one-way roads and ramps.
- White lines delineate the separation of traffic flows in the same direction or mark the right edge of the travel lane.
- Broken lines are permissive for crossing.
- Solid lines are restrictive to crossing.
- Width of line indicates the degree of emphasis.
- a normal width line is 100 mm wide
- a wide line is twice the width of a normal line or 200 mm.
- Double solid lines indicate maximum restrictions.
- Double lines where one line is solid and one is broken indicates a permissive movement to traffic on the broken side and a restrictive movement to traffic on the solid side of the line.

Longitudinal markings are shown in Figure TCS-C-201.

C2.3 Directional Dividing Lines

Directional dividing lines are used to delineate the portion of a two-way roadway available for traffic travelling in each direction.

Depending on whether passing is permitted, directional dividing line may consist of:

- single, solid, yellow line
- single, broken, yellow line
- double, solid, yellow line
- single, solid, yellow line and a single broken, yellow line.

Directional dividing lines are generally placed at the geometric centre of the pavement. On certain occasions, it may be desirable to place directional dividing lines off the roadway centre in order to make the most efficient use of the roadway.

Examples of off-centre line placement include:

- climbing or passing lanes
- pavement width transitions
- along urban roadways with reversible lane operation.

C2.3.1 Directional Dividing Lines on Rural Roads

On two-lane rural highway sections where passing is not normally hazardous in both directions, the directional dividing line shall be a broken yellow line of 100 mm width, and shall be reflectorized. Line segments shall be 3 m in length with 6 m gaps.

Where reduced sight distance makes passing hazardous, lines shall be marked in accordance with Section C2.9 No-Passing Zones.

On multi-lane undivided rural highways (under the jurisdiction of Alberta Transportation) of four or more lanes, the directional dividing line shall consist of two solid yellow lines, each 100 mm wide, separated by a space of 100 mm. These lines shall be reflectorized

On rural two-lane roadways not normally under the jurisdiction of Alberta Transportation, carrying low traffic volumes (where marking is not normally carried throughout the length of the roadway), it is desirable to mark the following locations:

- On approaches to the crest of a hill where the clear view ahead is less than the non-striping sight distance.
- In advance of and beyond any curve where the sight distance is less than the non-striping sight distance.
- On the approach to an arterial highway a no-passing zone for both directions of traffic on the intersecting road for a distance of not less than 60 m from the stop line and a no-passing zone of 300 m along the main roadway for the traffic approaching the intersection.
- For at least 300 m in advance of a level railway crossing.

Such markings shall consist of a single solid yellow line 100 mm wide and shall be reflectorized.

C2.3.2 Directional Dividing Lines on Urban Roads

On urban streets under Alberta Transportation jurisdiction posted at 70 km/h or less, the directional dividing marking shall consist of a single yellow line 100 mm wide.

In urban areas posted at 70 km/h or less, yellow single solid line indicates that a driver shall not cross the single solid line from one lane to another except when overtaking and passing another vehicle. Use of broken yellow line is not therefore required in urban areas to indicate that passing maneuvers are allowed.

On urban streets where the posted speed is in excess of 70 km/h, with at least two-lanes for free-moving traffic in each direction at all times, the directional dividing marking shall consist of two solid yellow lines, each 100 mm wide, separated by a space of 100 mm.

On controlled access highways in urban areas, directional dividing lines shall be the same as those for multi-lane undivided rural highways.

Where short sections of directional dividing lines are used to indicate that passing is hazardous, such as at approaches to controlled intersections and railway crossings or where the sight distance is restricted, a single solid yellow line 100 mm wide shall be used.

C2.4 Lane Lines

Lane lines delineate the separation of traffic flows in the same direction. Standard lane lines shall be white lines 100 mm wide and shall be reflectorizied. Line segments shall be 3 m in length with 6 m gaps for both rural and urban applications.

- Broken lane lines are permissive in character and indicate that passing is permitted where traffic allows.
- Solid lane lines are restrictive in character and are used at certain intersections to

discourage lane changing and encourage proper lane usage when turning onto a multi-lane roadway.

- Single and double solid lines are typically used for complex situations (e.g. to restrict weaving maneuvers).
- Wide lines are used for merging and diverging areas for emphasis.

C2.4.1 Lane Lines on Rural Roads

Lane lines on rural roads should be used in the following situations:

- On all rural highways with more than one lane in the same direction.
- On all divided highways.
- On approaches to widened intersections where the roadway is required to accommodate more lanes of traffic than would be the case without the use of lane lines.

Lane lines shall not be painted through any intersections having four or more legs but shall be stopped at approximately 10 m from the centerline of the intersecting roadway or at the stop bar or the crosswalk line, if they are present.

Lane lines, which delineate deceleration and acceleration lanes at "T" intersections, shall be stopped at approximately 10 m from the centerline of the intersecting roadway but they may continue through a designated by-pass lane.

Lanes lines may continue through intersections with private driveways, commercial accesses, field and forestry approaches.

C2.4.2 Lane Lines on Urban Roads

Lane lines on urban streets should be used in the following situations:

- On all controlled access highways and arterial streets with three or more lanes.
- On all one-way arterial streets.
- At crosswalks and in hazardous locations.
- At locations where the roadway is required to accommodate more lanes of traffic than would be the case without the use of lane lines. These include:
  - locations between loading islands and sidewalk curbs
  - approaches to widened intersections.

C2.5 Edge Lines

Edge lines delineate the shoulder from the travel lane. Edge lines shall be:

- Continuous white, reflectorized lines when placed on the right hand side of the travel lane.
- Continuous yellow, reflectorized lines when placed on the left hand side of the travel lane.
- Standard edge lines shall be 100 mm wide.

C2.5.1 Edge Lines on Rural Roads

Road marking to delineate the shoulder shall be used on all rural highways where the shoulder is paved.

Breaks in edge lines approximately 20 m in length shall be made at intersections and approaches to graded municipal roads, farm sites with dwellings and business establishments.

Edge lines may continue through field and forestry approaches.

The edge lines at all intersections with rural cross-section shall continue to the beginning of a curve on each approach road.

The solid yellow edge lines shall be continued around the nose of all breaks in the median on divided highways, except where traffic volumes are less than 100 vehicles per day on the intersecting roadway.

Wide edge lines are used in merging and diverging areas for emphasis.

C2.5.2 Edge Lines on Urban Roads

Edge lines shall be painted on all urban divided roadways posted at 80 km/h or more.

On urban roadways where the posted speed is less than 80 km/h, edge lines line markings may be provided selectively due to the presence of curb or curb and gutter or other visible breaklines that delineate the edge of road.

The following situations may warrant marking an edge line:

- Where the width of paved shoulders exceeds 0.5 m.
- In advance of and over narrow bridges.
- In advance of and around sharp curves.
- In merging and diverging areas.
- At pavement width transitions.
- Where obstructions on the shoulder are close enough to the pavement edge to constitute a hazard to the motorists.
- Where unusual physical conditions exist.
- Where there is no street lighting.
- Wide edge lines are used in merging and diverging areas for emphasis.

C2.6 Continuity Lines

Continuity lines are lane lines, which are used across the merging and diverging areas.

Continuity lines shall be white, discontinuous and 100 mm wide. Line segments shall be 3 m in length with 3 m gaps for both rural and urban applications.

Wide continuity lines shall be twice the width of the standard line. Wide lines shall be painted at all merge and diverge areas of high speed freeways and expressways.

C2.6.1 Continuity Lines on Rural Roads

Continuity lines on rural roads should be used for the following situations:

- At all acceleration and deceleration lanes.
- To separate auxiliary turn lanes from the through lanes at all intersections.
- At downstream end of passing and climbing lines.
- For merging and diverging lanes.

Wide lines are used for all merging and diverging lanes on rural expressways and freeways.

Where auxiliary lanes are used for merging and diverging movements, such as truck climbing lanes and passing lanes, continuity lines should continue throughout the entire diverge zone.

At an intersection, the pavement marking scheme should be primarily based on traffic conditions (i.e. speeds, turning movements,

delay, etc.), however, when assessing existing intersections, the geometrics (particularly the pavement width and layout) may influence the choice of pavement markings to be used.
Where an intersection layout is appropriate for the current traffic conditions and it is in accordance with the Highway Geometric Design Guide, the pavement markings should be provided as follows:

DESIGN TREATMENT	PAVEMENT MARKING PLAN FOR CONTINUITY LINES
Type I	No continuity lines.
Type II	Normally, continuity lines direct through traffic to stay adjacent to centreline. When there is a vehicle waiting to make a left turn, through traffic is allowed to use the auxiliary lanes as a by-pass lane .
Type III	Normally, continuity lines direct through traffic to stay adjacent to centreline. On the sides where a bypass lane and taper is constructed (typically 40:1 for 100 km/h or higher design speeds), through traffic may use the auxiliary lanes as a by-pass lane when required.
Type IV and V	On the sides where a full bypass lane and taper is constructed (typically 60:1 for 100 km/h or higher design speeds) then the continuity lines will direct through traffic to the bypass lane.

Where the layout is not consistent with design requirements included in the Highway Geometric Design Guide, consideration should be given to improving the geometrics at an appropriate time. If improvements are to be deferred for some time, then the following guidelines may be used to mark the pavements in the interim:

- Where the warrant for an exclusive left turn lane (Type IV treatment) is met, it is desirable to use a continuity line which diverts the through traffic to a bypass lane. The desirable taper rate for the bypass lane is 60:1 (for higher speeds), however, a taper at 40:1 is acceptable on an existing intersection.

  If the existing pavement is only suitable for a 25:1 taper, it is better to leave the entry point open-ended so that drivers may continue to use the through lane (in normal circumstances) or use the taper (likely at lower speed) if there is another vehicle waiting to make a left turn (effectively blocking the through lane). For lower speeds, shorter tapers are acceptable as outlined in the Highway Geometric Design Guide.

- Where the design warrant for Type III is met but the layout is not suitable for a Type III pavement marking layout, the following guidelines should be used.

  This guideline applies to all intersections on divided and undivided highways:

  - an auxiliary lane should not be painted unless it can be at least 3.3 m wide
  - a Type II pavement marking layout may be used if the pavement is wide enough.

C2.6.2 Continuity Lines on Urban Roads

Continuity lines on urban streets should be used for the following situations:

- At all acceleration and deceleration lanes.
- To separate auxiliary turn lanes from the through lanes at intersections.
- For merging and diverging lanes.

Wide lines may be used for the following situations:

- At intersections, on high-speed urban arterial streets with traffic volumes of more than 10,000 vehicles per day.
- For all merging and diverging lanes on expressways and freeways.

C2.6.3 Guiding Lines

Guiding lines are special lines used to delineate the path of turning vehicles at complex intersections with dual left turn lanes.

Guiding lines shall be white, discontinuous and 100 mm wide. Line segments shall be 0.5 m in length with 0.5 m gaps for both rural and urban applications.

C2.7 Pavement Width Transitions

Line markings shall be used to indicate points where the pavement widths change, as illustrated in Figure TCS-C-205. At the end of such a section, on each side of the road, one or more lane lines must be discontinued and the remaining directional dividing line and lane lines must be connected in such a way as to merge traffic into the reduced number of lanes.

Lines marking pavement width transitions shall be 100 mm wide and of standard directional dividing line or lane design. They shall also be reflectorized.

Through the transition area, in the direction of convergence, the line separating the opposing directions of the traffic shall be of barrier design, either the double solid directional dividing line of a multi-lane road or a broken directional dividing line with an adjacent barrier line as prescribed for no-passing zones. A gore area marking shall also be provided at each transition.

Pavement width transition lines, in themselves, are not to be considered sufficient warning at such locations. They shall always be used to supplement the standard warning signs.

Where there are pavement transition from two-lane undivided to four-lane divided, the chevron markings shown in Figure TCS-C-205 shall be used in all cases to provide additional emphasis.

C2.8 Passing and Climbing Lanes

Passing and climbing lanes on two-lane undivided highways shall be marked in accordance with Figure TCS-C-210.

At the entrance to the passing or climbing lane, traffic is diverted into the right hand lane. At the exit, the merge manoeuvre shall be completed to the left and, in general, the right of way shall be given to the vehicles travelling in the inside lane.

C2.9 No-Passing Zones

No-passing zones shall be established on two-lane highways where passing must be prohibited because of restricted sight distance or other hazardous conditions on vertical and horizontal curves. Other locations are listed in this section.

A vertical or horizontal curve shall warrant a no-passing zone and shall be so marked when

the minimum sight distance is equal to or less than 425 m. This distance is based upon the non-striping sight distance outlined in Section B2.5 of the Alberta Transportation Highway Geometric Design Guide, and the information in the report "Pavement Markings for Rural and Urban Highways in Alberta" dated April, 1999.

C2.9.1 No-Passing Zones on Two-Lane Roads

On a two-lane road, a no-passing zone is indicated by a solid yellow line for the direction in which passing is not permitted. The directional dividing line may be a double solid yellow line where no-passing zones apply in both directions or a simultaneous solid and broken yellow line where no passing applies in only one direction.

These markings are illustrated in Figures TCS-C-215 to TCS-C-215.3.

C2.9.2 No-Passing Zones on Three-Lane Roads

On three-lane roads where there are two-lanes in one direction and one-lane in the other, the directional dividing line may be a double solid yellow line where no-passing zones apply in both directions, or simultaneous solid and broken yellow lines where no passing applies in only one direction.

C2.9.3 No-Passing Zones On Urban Roads

On urban streets, it is not usually necessary to mark no-passing zones. Traffic speeds are generally low and a single solid directional dividing line is usually sufficient. On high–speed arterial streets where no-passing zone markings are required, the standards should be the same as for rural roads.

C2.9.4 Establishing No-Passing Zones

The no-passing sight distance must be established in the field using the methods outlined below and illustrated in Figures TCS-C-215 to TCS-C-215.3.

Sight distance on a vertical curve is the distance at which an object 1150 mm above the pavement surface can just be seen from another point 1150 mm above the pavement surface. Similarly, sight distance on a horizontal curve is the distance measured along the centreline of the roadway (or the centreline of the right lane of a three lane highway) between two points 1150 mm above the pavement surface on a line tangent to any obstruction that cuts off the view on the inside of the curve. This approximates the distance traveled by the vehicle along the lane.

The beginning of a no-passing zone (Ab,Bb in Figure TCS-C-215.1) is where the sight distance first becomes less than 425 m for the direction of travel being considered. The end of the zone (Ae, Be, in Figure TCS-C-215.1) is where the available sight distance again becomes greater than 425 m for the same direction of travel.

The resulting solid line should not be less than 100 m in length. If the actual no-passing distance is less than 100 m in length, the solid line should be extended to 100 m in length with the additional length added at the beginning of the no-passing zone.

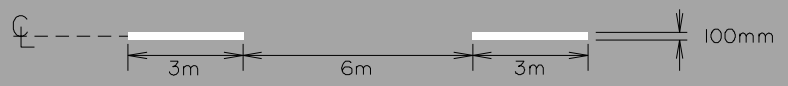
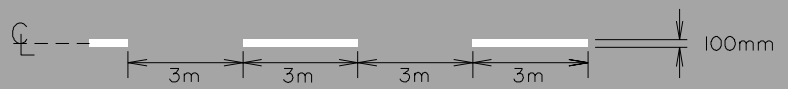
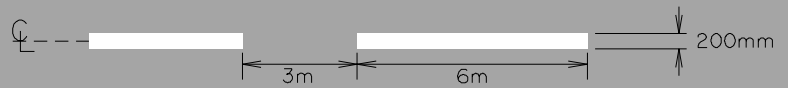
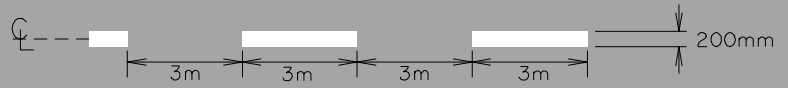
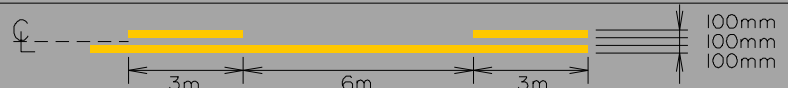
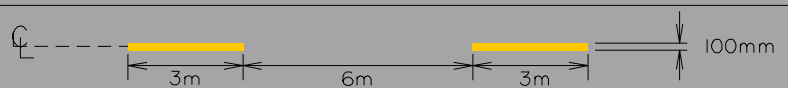
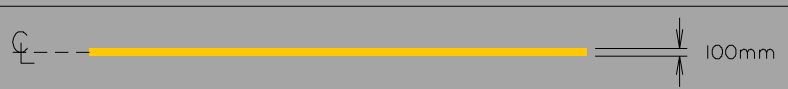
If a passing zone is less than 100 m long between two no-passing zones, then the no-passing zone should be continuous throughout the entire length.

The detailed method of establishing the beginning and end of solid lines for no-passing zones on vertical curves is illustrated in Figure TCS-C-215.2 and described below:

Step 1: Commencing on the upgrade side of the curve (i.e. travelling eastbound as shown in the Figure), workers A and B pull line taut with A sighting through the slot peephole in his target at frequent intervals to see B's target. At the point where the center of B's target just drops out of sight, A marks a "T" at point Ab, as shown in the Figure. Immediately afterwards, B takes a look through the slot peephole in his target to make sure that A'' target is still visible and marks a "T" at point Be as shown in the Figure.

Step 2: A and B continue over the vertical curve with A sighting B's target until the center of B's target becomes just visible to A. A then marks a "T" at point Ae, as shown in the Figure. Immediately afterwards, B takes a look through the slot peephole in his target to make sure that A's target is still visible and marks a "T" at point Bb, as shown in the Figure.

Step 3: The application of solid lines for no passing zones on successive vertical curves (or successive horizontal curves) and the method of establishing them in the field is shown in the attached Figure TCS-C-215.3. Care must be taken to check the sight distance available and to verify the start and end points of barrier lines accordingly in situations where the distance between three successive crests is shorter than 425 m. The checking procedure must ensure that 1150mm target is visible in the subject direction for the entire 425m from any point 1150mm above a broken line. The checking procedure is required to eliminate "hidden dips" or other blind spots.

LINE TYPE	PATTERN	USE
SOLID		• EDGE LINES • LANE LINES PROHIBITING LANE CHANGES
SIMULTANEOUS SOLID AND BROKEN		• LANE LINES FOR SPECIAL CASES PROHIBITING LANE CHANGES FROM LANE BOUNDED BY SOLID LINE
BROKEN		• LANE LINES
BROKEN		• CONTINUITY LINES
BROKEN		• GUIDING LINES FOR INTERSECTION MOVEMENT
SOLID WIDE (CRITICAL AREAS)		• EDGE LINES FOR CRITICAL AND SPECIAL LANE DESIGNATION (eg. RAMPS, BUS LANES, AND HOV LANES)
BROKEN WIDE (CRITICAL AREAS)		• LANE LINES FOR CRITICAL AND SPECIAL LANE DESIGNATION (eg. RAMPS, BUS LANES, AND HOV LANES)
BROKEN WIDE (CRITICAL AREAS)		• CONTINUITY LINES FOR CRITICAL AREAS (eg. RAMPS)
DOUBLE SOLID		• DIRECTIONAL DIVIDING LINES PROHIBITING PASSING FROM EITHER DIRECTION
SIMULTANEOUS SOLID AND BROKEN		• DIRECTIONAL DIVIDING LINES PROHIBITING PASSING FROM LANE BOUNDED BY SOLID LINE
BROKEN		• DIRECTIONAL DIVIDING LINES PERMITTING PASSING
SOLID		• EDGE LINE (LEFT EDGE OF DIVIDED HIGHWAY) • DIRECTIONAL DIVIDING LINES (URBAN SITUATION)

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-2.01	B.B.	Mar/03

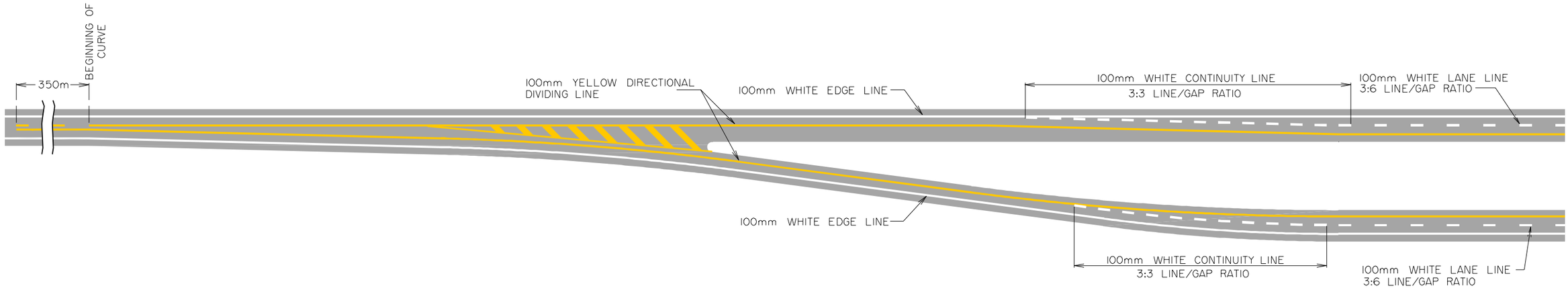
Alberta TRANSPORTATION

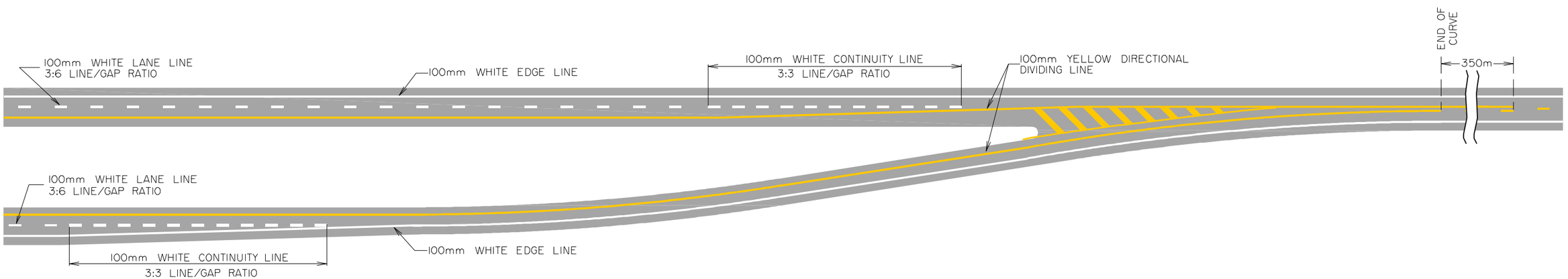
FIGURE TCS-C-201

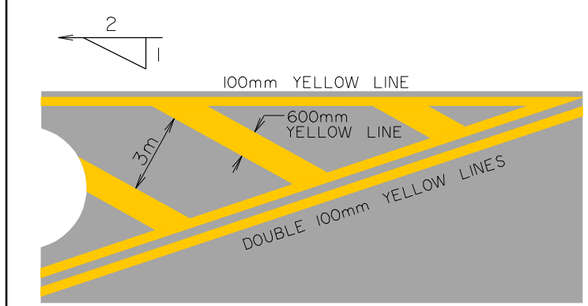
Date: MAY 1999

LONGITUDINAL PAVEMENT MARKINGS DIMENSIONS AND DEFINITIONS

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C2







TRANSITION

GORE AREA MARKING

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-2.02	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE TCS-C-205

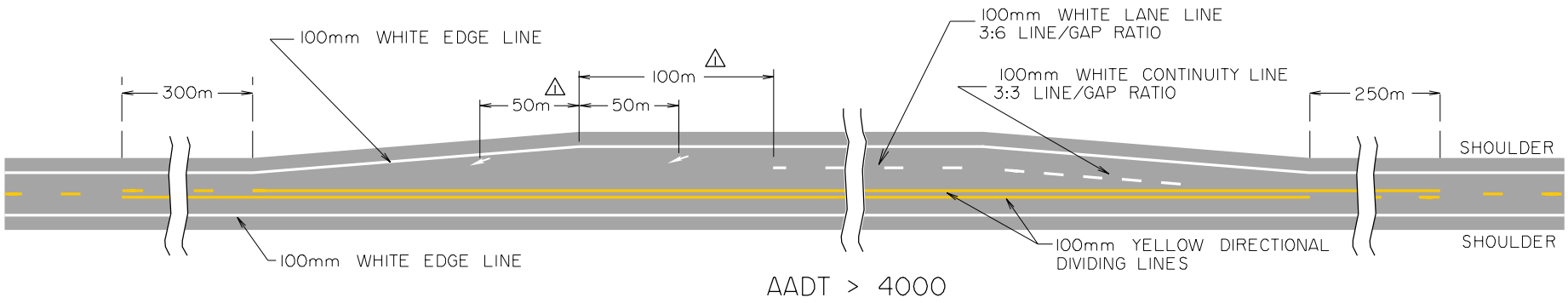
Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

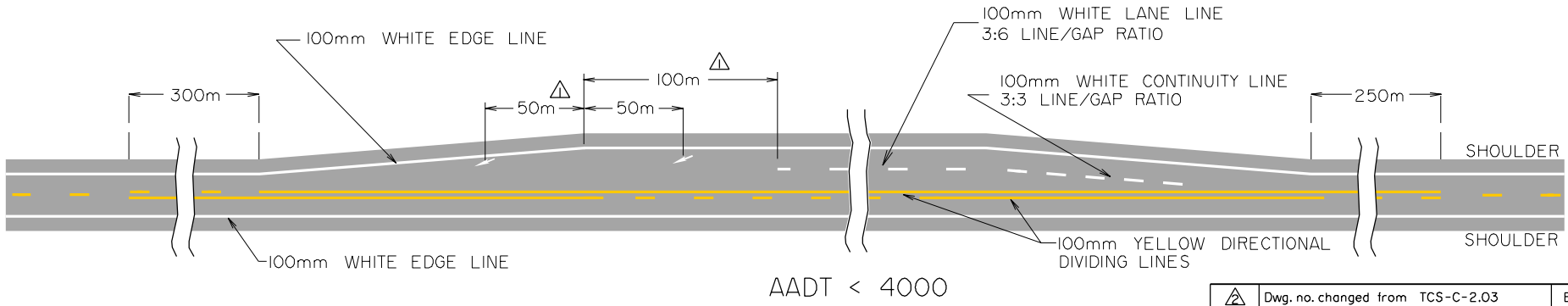
TRANSITIONS

(4 - LANE DIVIDED TO 2 - LANE UNDIVIDED)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C2



AADT > 4000



AADT < 4000

NOTE:

1. AADT>4000 PASSING PROHIBITED IN SINGLE LANE DIRECTION.

2. AADT<4000 PASSING PERMITTED IN SINGLE LANE DIRECTION, PROVIDED SUFFICIENT SIGHT DISTANCE IS AVAILABLE.

No.	DESCRIPTION	BY	DATE
2	Dwg. no. changed from TCS-C-2.03	B.B.	Mar/03
1	Merge arrows relocated; Broken white line shortened.	B.B.	Aug/01

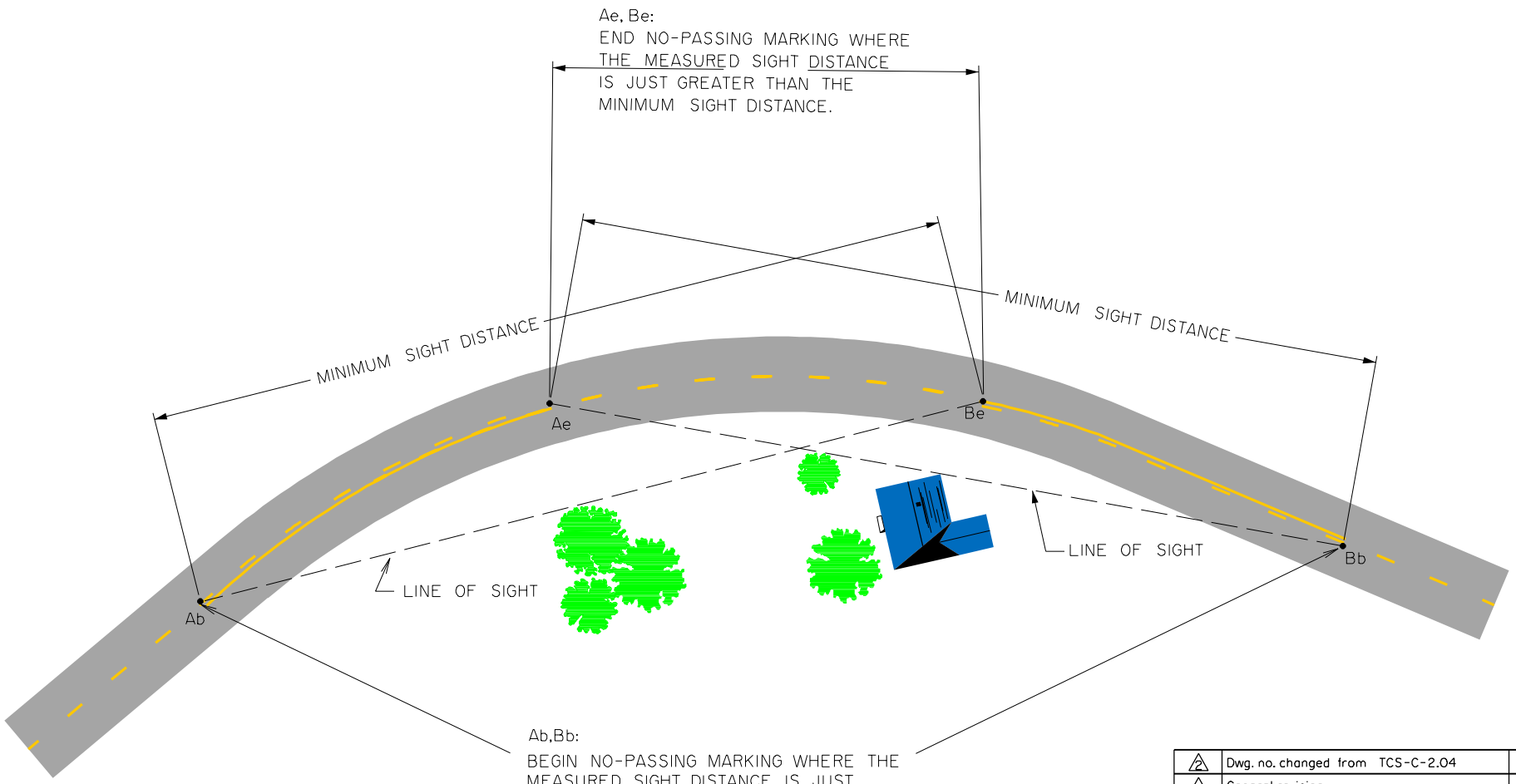
Alberta TRANSPORTATION

FIGURE TCS-C-210

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
PASSING & CLIMBING LANES

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C2



THE ACTUAL SIGHT DISTANCE IS MEASURED BY:
1) TRANSIT AND STADIA ROD; OR
2) TWO TARGETS WITH A ROPE OR CHAIN

No.	DESCRIPTION	BY	DATE
2	Dwg. no. changed from TCS-C-2.04	B.B.	Mar/03
1	General revision	B.K.	Nov/01

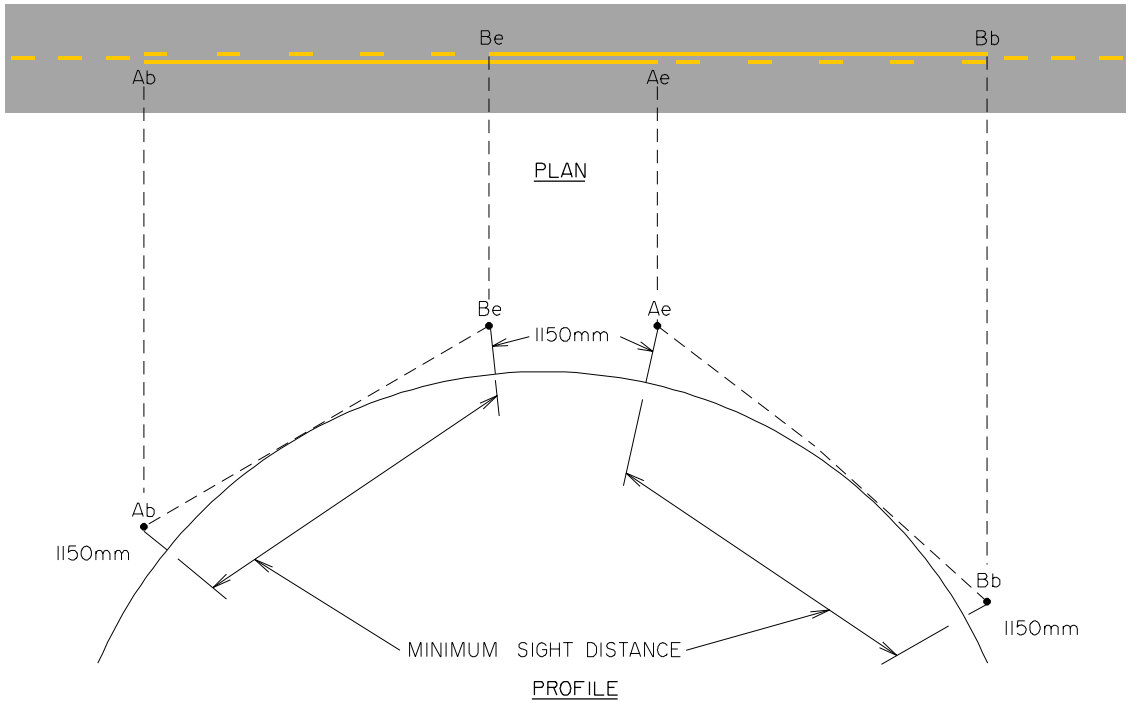
Alberta TRANSPORTATION

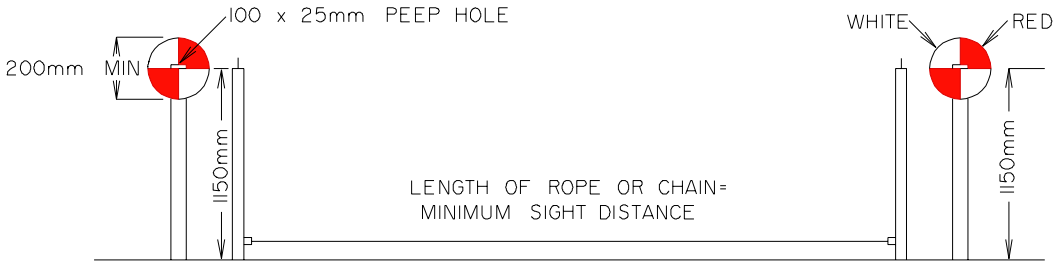
FIGURE
TCS-C-215

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
NO-PASSING ZONES ON HORIZONTAL CURVES

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C2





THE ESTABLISHMENT OF THE END POINTS OF SOLID LINES FOR NO-PASSING ZONES IS ACCOMPLISHED WITH THE AID OF TWO TARGETS, AS SHOWN. THE LENGTH OF THE ROPE OR CHAIN JOINING THE TWO TARGETS IN THE LOWER FIGURE IS THE MINIMUM SIGHT DISTANCE FOR NO-PASSING ZONE PAVEMENT MARKINGS.

THE SIGHT DISTANCES SHOULD ALSO BE CHECKED IN THE HORIZONTAL PLANE.

No.	DESCRIPTION	BY	DATE
2	Dwg. no. changed from TCS-C-2.05	B.B.	Mar/03
1	General Revision	B.K.	Nov/01

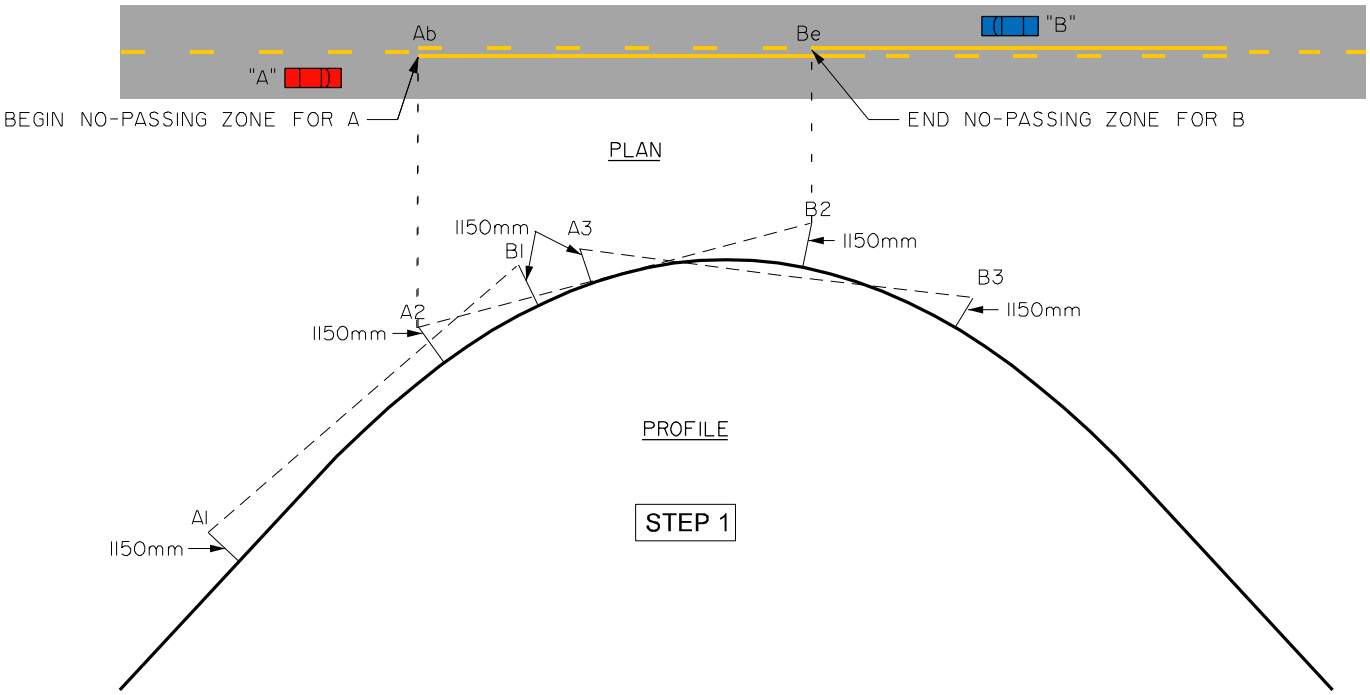
Alberta TRANSPORTATION

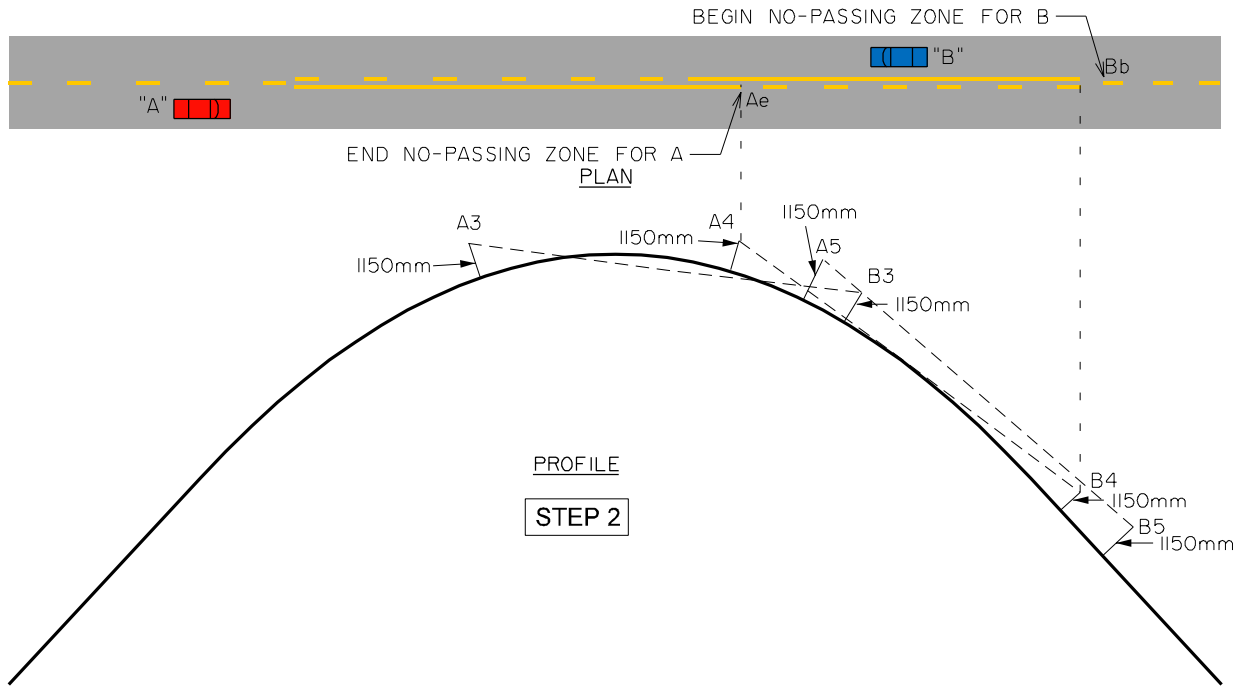
FIGURE
TCS-C-215.1

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
NO-PASSING ZONES ON VERTICAL CURVES

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C2





Notes:

1. Distance between A and B must be kept at 425 meters at all times.
2. Sighting is done from both directions prior to markng of points Ab, Be, Ae and Bb.
3. Direction of travel of surveying team (A1-► A2-► A3-► A4-► A5) is assumed to be from left to right in the sketches above. If direction of travel is reversed, do Step 2 before Step 1.

No.	DESCRIPTION	BY	DATE
2	Dwg. no. changed from TCS-C-2.06	B.B.	Mar/03
1	Number of steps reduced from 4 to 2	B.K.	Nov/01

Alberta TRANSPORTATION

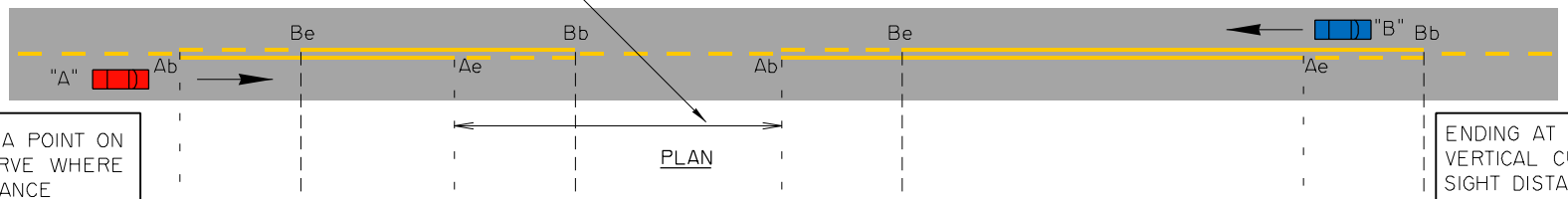
FIGURE
TCS-C-215.2

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
THE TERMINI OF NO-PASSING ZONES ON VERTICAL CURVES

Prepared By: R.M.	Checked By: S.M.	Scale: N.T.S.	Section C2

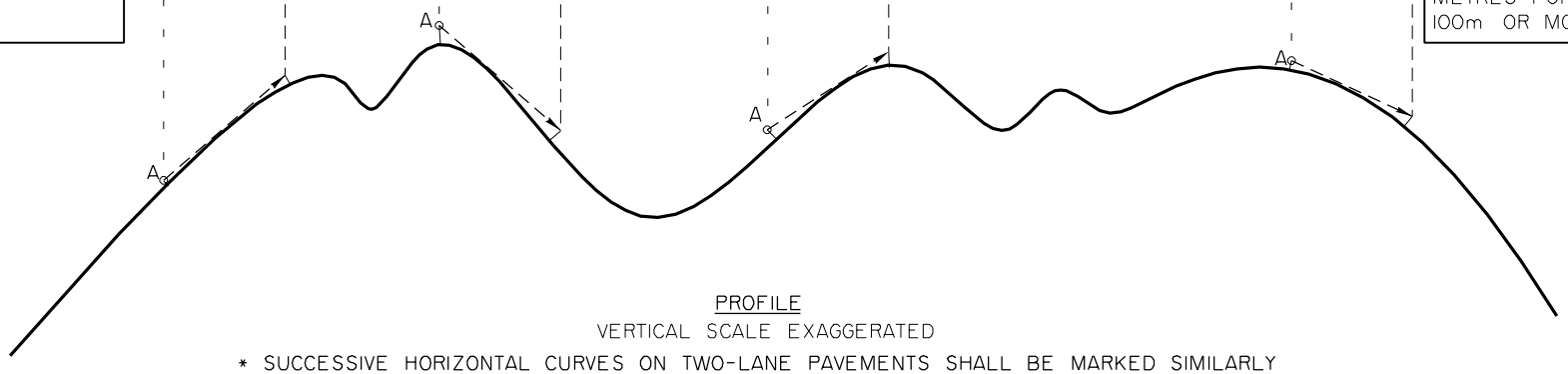
IF THIS DISTANCE IS LESS THAN 100m, THE BARRIER LINE SHOULD CONNECT THE END OF THE FIRST ZONE WITH THE BEGINNING OF THE NEXT ZONE.



BEGINNING AT A POINT ON THE FIRST CURVE WHERE A's SIGHT DISTANCE DROPS TO LESS THAN 425 METERS.

PLAN

ENDING AT A POINT ON THE LAST VERTICAL CURVE WHERE A's SIGHT DISTANCE INCREASES TO AND REMAINS AT 425 METRES FOR A DISTANCE OF 100m OR MORE.



PROFILE

VERTICAL SCALE EXAGGERATED

* SUCCESSIVE HORIZONTAL CURVES ON TWO-LANE PAVEMENTS SHALL BE MARKED SIMILARLY

NOTES:

1. FOR CLARITY, ESTABLISHMENT OF THE BEGINING AND END OF THE BARRIER LINES IN THE "A" DIRECTION ONLY IS SHOWN. ARROWS INDICATE THE DIRECTION OF THE LINE OF SIGHT.

2. CARE SHOULD BE EXERCISED TO CHECK THE SIGHT DISTANCE AVAILABLE AND TO ESTABLISH THE BARRIER LINES ACCORDINGLY IN SITUATIONS WHERE THE DISTANCE BETWEEN SUCCESSIVE CRESTS IS LESS THAN 425 METERS. THIS IS INTENDED TO ADDRESS PROBLEMS ASSOCIATED WITH "HIDDEN DIPS" IN THE VERTICAL ALIGNMENT.

No.	DESCRIPTION	BY	DATE
2	Dwg. no. changed from TCS-C-2.07	B.B.	Mar/03
1	General revision. Dwg. title corrected.	BK	Nov 01

Alberta TRANSPORTATION

FIGURE TCS-C-215.3

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

NO-PASSING ZONES ON SUCCESSIVE VERTICAL CURVES ON TWO-LANE PAVEMENTS

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C2

C3 Transverse Markings

C3.1 Introduction

This section comprises the following sub-sections:

- Stop Lines
- Crosswalk Lines
- Roadside Turnouts
- Railway Crossings
- Aircraft Patrol Zones

Transverse markings are shown in Figure TCS-C-301.

C3.2 Stop Lines

Stop lines are solid white lines, normally 300 mm to 600 mm wide, dependent on traffic volumes and visibility, and extending across all approach lanes. Stop lines of 300 mm width may be used in urban situations. 600 mm stop lines are used in most rural highway applications.

Stop lines should be used in both rural and urban areas where it is important to indicate the point, behind which vehicles are required to stop, in compliance with a stop sign, traffic signal, officers direction, or other legal requirement.

Stop lines, where used, should be placed 1.0 m in advance of and parallel to the nearest crosswalk line. In the absence of a marked crosswalk, the stop line should be placed at the desired stopping point, in no case less than 1.2 m from the nearest edge of the intersecting lane.

The exact location of a stop line should be established in the field based on site-specific conditions. These conditions may include the intersection geometry, paths of turning vehicles, presence of obstructions along a sight line and other operational conditions.

A stop sign should always be used in conjunction with a stop line, and it should be placed adjacent to the stop line. On gravel roads it is not practical to provide a stop line. In these cases the stop sign should be placed near the stopping point.

Stop lines are shown in Figure TCS-C-305.

C3.3 Crosswalk Lines

C3.3.1 General Information

Crosswalk markings at signalized intersections and across intersectional approaches, on which traffic stops, serve primarily to guide pedestrians in the proper paths.

Crosswalk markings along roadways at other locations (i.e., mid-block crossings) not only delineate the path for pedestrians but also serve to warn the motorists of a pedestrian crossing point. At non-intersectional locations, these markings legally establish the crosswalk. All marked mid-block pedestrian crosswalks must be provided with standard signs indicating a pedestrian crossing. Typical layouts of markings for pedestrian crosswalks are illustrated in Figure TCS-C-305.

C3.3.2 Crosswalk Lines

Crosswalk lines shall be solid white lines, marking both edges of the crosswalk. They shall be 200 mm in width and should be spaced not less than 2.5 m apart. In urbanized areas, the width of a crosswalk should reflect the volume of pedestrians crossing at that location at one time. Crosswalk lines shall be placed as close as possible to right angles to the roadway being crossed. Crosswalk lines should be offset from the near edge of the travel lane by 1.2 m.

C3.3.3 Zebra Crosswalk Markings

For added visibility, the area of the crosswalk may be marked with white longitudinal lines at a 90 degree angle to the line of the crosswalk to provide a Zebra crosswalk. These lines should be approximately 600 mm wide and spaced 600 mm apart. When Zebra type lines are used to mark a crosswalk the transverse crosswalk parallel lines shall be omitted. Zebra crosswalk markings should be considered in the following situations:

- At all school crosswalks.
- At crossings involving children, the elderly or handicapped (e.g. near hospitals, senior citizen homes, etc.).
- At pedestrian crossings located within high speed traffic zones (in excess of 70 km/h).
- At all mid-block pedestrian crossings.
- At crosswalks that are hidden or with the reduced sight distances on the approaches where Zebra crosswalk markings could improve the visibility of a crossing.
- At raised traffic islands (free right turns).

Care should be taken to ensure that pedestrian crosswalks marked with zebra crossings do not weaken or detract from other crosswalks where special emphasis markings are not used.

C3.3.4 Crosswalk Warrants

Crosswalks should be marked at all intersections where there are substantial conflicts between vehicle and pedestrian movements. Marked crosswalks should also be provided at other appropriate points of pedestrian concentration, such as at loading islands, mid-block pedestrian crossings, or where pedestrians could not otherwise recognize the proper place to cross.

In general, it is not desirable to have crosswalk markings where the posted speed is greater than 70 km/h.

Crosswalk markings should not be used indiscriminately. An engineering study should be undertaken before they are installed at locations away from traffic signals or stop signs.

Since non-intersectional pedestrian crossings are generally unexpected by motorists, crosswalk signs should be installed and adequate visibility provided by parking restrictions.
Generally, the procedures outlined in the Transportation Association of Canada Pedestrian Crossing Manual may be used to determine crossing warrants, and in particular, where and what type of additional traffic control devices are required.

C3.4 Roadside Turnout

Roadside turnout shall be marked in accordance with Figures TCS-C-310 and TCS-C-315.

C3.5 Railway Crossings

Railway Crossing markings for a railway crossing shall consist of double stop bars 30 cm in width and 30 cm apart for both rural and urban applications. The markings are white and reflectorized. They are placed perpendicular to the roadway at a distance of 4.5 m from the near rail.

Stop bars merely provide a stopping point for vehicles and must always be used in conjunction with signs and other devices. The stop bars and an "X" mark are typically not required at railway crossings if other regular pavement markings such as centre lines or edge lines are not used.

It is important to check the sight line requirements at railway crossings in accordance

with Transport Canada guidelines.

C3.5.1 Railway Crossings on Rural Roadways

On rural highway approaches to a railway crossing a "No Passing" zone is introduced for a distance of 300 m in advance of the railway tracks.

An "X" marking shall be placed in advance of the Stop bar, 10 m after the appropriate WC-4 advance railway crossing sign measured to the centre of the "X". A WC-4 advance railway crossing sign is placed 210 m from the railway tracks.

Pavement markings at railway crossings with rural roads shall conform to those shown in Figure TCS-C-320.

C3.5.2 Railway Crossings on Urban Roadways

Railway crossing markings consisting of double stop bars and the "X" marking shall be installed at all railway crossings located along urban roadways posted at 80 km/h or more.

On roadways where posted speed is less than 80 km/h, the "X" marking should only be considered at locations which have reduced visibility or where advance warning is required due to operational or safety concerns..

The exact location of "X" marking in urban situations would normally depend on various factors such as the presence of intersecting roadways or other obstructions.

Engineering judgement should always be exercised when selecting location for "X" marking. The "X" marking should not, however, be placed closer than 40 m from the railway tracks.

The "X" marking should always be placed 10 m after a WC-4 advance railway crossing sign. Location of a WC-4 sign will vary significantly from site to site and may also require adjustments in the field.

Pavement markings at railway crossings with urban roads shall conform to those shown in Figure TCS-C-320.1.

C3.6 Aircraft Patrol Zones

An aircraft patrol zone marking is a transverse marking placed on the roadway for the purpose of assisting in the enforcement of speed regulations. Speed measurement markings, if used shall be yellow and shall be 450 mm wide.

They extend between the shoulder lines of the paved surface at 500 m intervals over a 3 km length of roadway. Advisory signs may be used in conjunction with these markings. Aircraft Patrol Zones shall be marked in accordance with Figure TCS-C-325.

These markings must be certified by an Alberta Transportation engineer on the Aircraft Patrol certificate.

An example of the Aircraft Patrol Zones certificate is included on the following page.

THE PROVINCE OF ALBERTA
ALBERTA TRANSPORTATION

CERTIFICATE AS TO DISTANCE
AND LOCATIONS OF

AIRCRAFT PATROL ZONES AND MEASUREMENTS
AS MARKED ON PROVINCIAL HIGHWAYS

PURSUANT TO SECTION 165 OF THE TRAFFIC SAFETY ACT
THIS WILL CERTIFY AS FOLLOWS:

AIRCRAFT PATROL ZONE ON HIGHWAY NUMBER _____

LOCATED IN THE NUMBER _____LANES

BETWEEN

_____AND_____

(indicates nearest points i.e. Hwy. Junctions, or County, City, Town or Village boundaries)

IN THE PROVINCE OF ALBERTA

THE AIRCRAFT PATROL ZONE CONSISTS OF

_____KILOMETRES

AND IS MARKED IN 0.5 KILOMETRE LENGHTS

BY _____LINES.

EACH 0.5 KILOMETRE HAS BEEN MEASURED

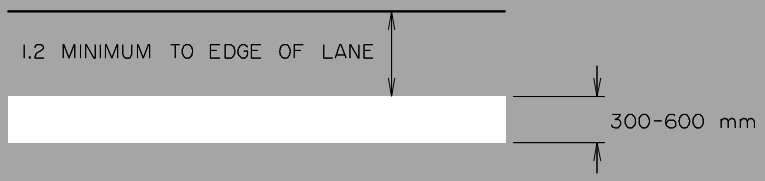
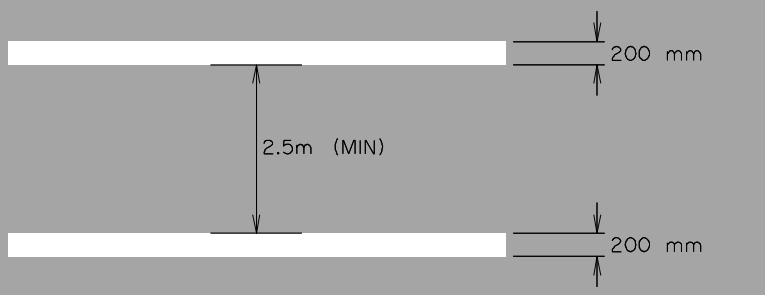
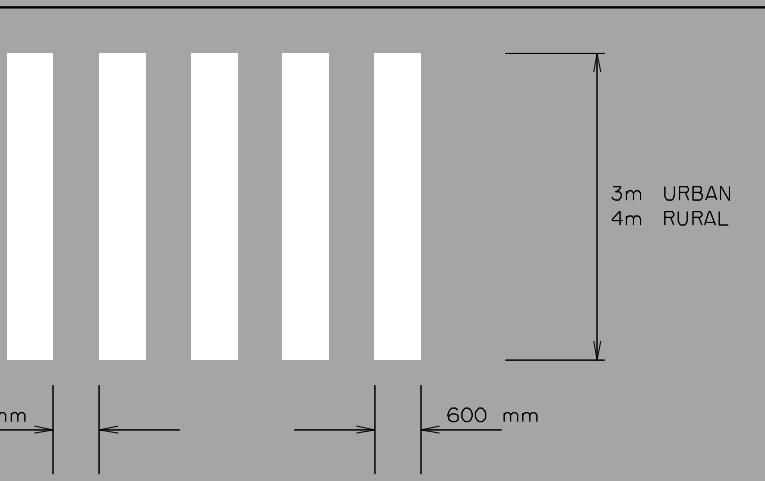
AND CONSISTS OF 500 METRES

This certificate is issued pursuant to Section 165 of the Traffic Safety Act and the above measurements and markings are true and accurate to the best of my knowledge.

CERTIFIED AT _____, ALBERTA ON
_____ A.D.

_____
(full name)

An Engineer, employed by
Alberta Transportation
in and for the Province of Alberta

LINE TYPE	PATTERN	USE
STOP BAR		STOP LINE
STANDARD CROSSWALK		STANDARD CROSSWALK
ZEBRA CROSSWALK		ZEBRA CROSSWALK FOR ADDED VISIBILITY

No.	DESCRIPTION	BY	DATE
2		---	
1	Dwg. no. changed from TCS-C-3.01	B.B.	Mar/03

Alberta TRANSPORTATION

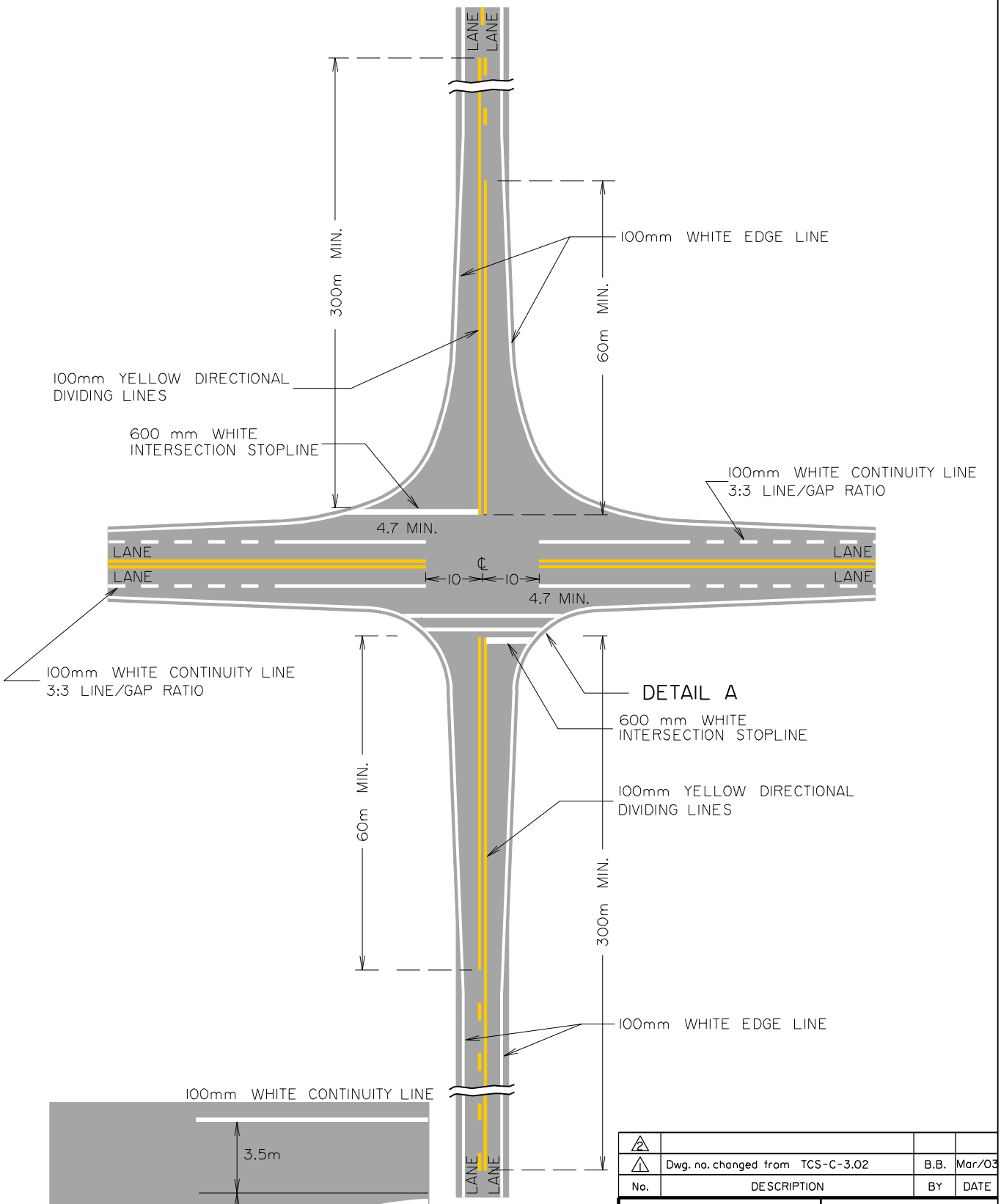
FIGURE TCS-C-301

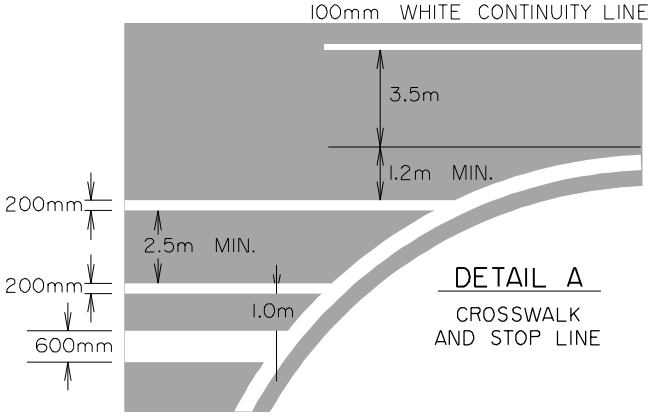
Date: MAY 1999

TRANSVERSE PAVEMENT MARKINGS

DIMENSIONS AND DEFINITIONS

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C3





DETAIL A

CROSSWALK
AND STOP LINE

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-3.02	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE
TCS-C-305

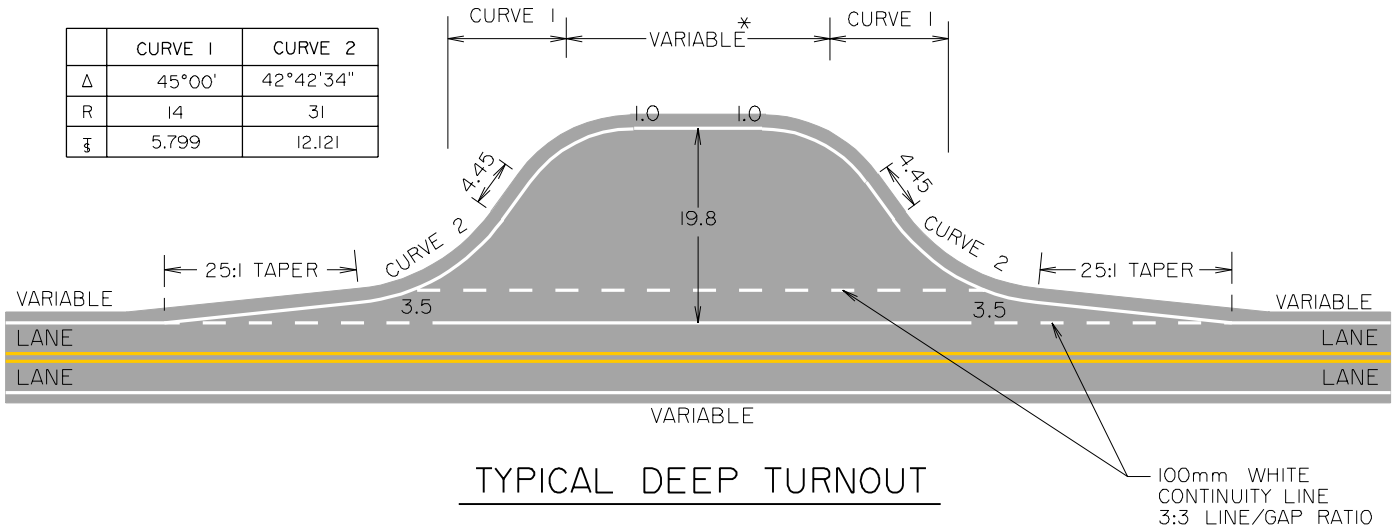
Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

CROSSWALK & STOP LINES AT RURAL INTERSECTIONS

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C3

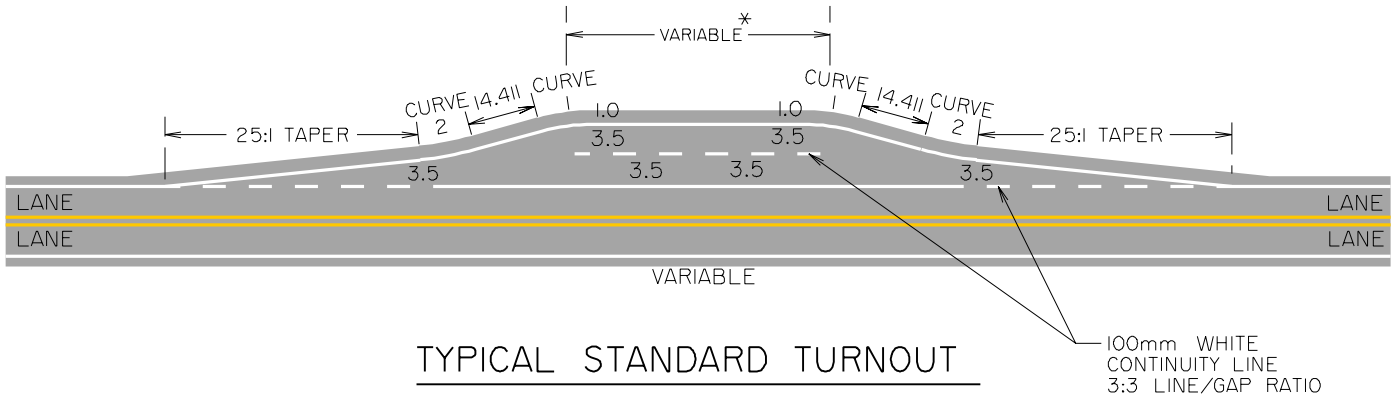
	CURVE 1	CURVE 2
Δ	45°00'	42°42'34"
R	14	31
T	5.799	12.121



TYPICAL DEEP TURNOUT

	CURVE 1	CURVE 2
Δ	9°55'34"	7°38'08"
R	29	41
T	2.518	2.736

100mm WHITE CONTINUITY LINE
3:3 LINE/GAP RATIO



TYPICAL STANDARD TURNOUT

NOTE:

* THE SUGGESTED MINIMUM LENGTH OF TURNOUT IS 30m.
STANDARD TURNOUT FOR LOW VOLUME RECREATIONAL ROADS IS 60m LONG AND 8m (DESIRABLE), 6m (MINIMUM) WIDE FROM EDGE OF SHOULDER.

SEE GEOMETRIC DESIGN GUIDE FOR LAYOUT DETAILS.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-3.03	B.B.	Mar/03

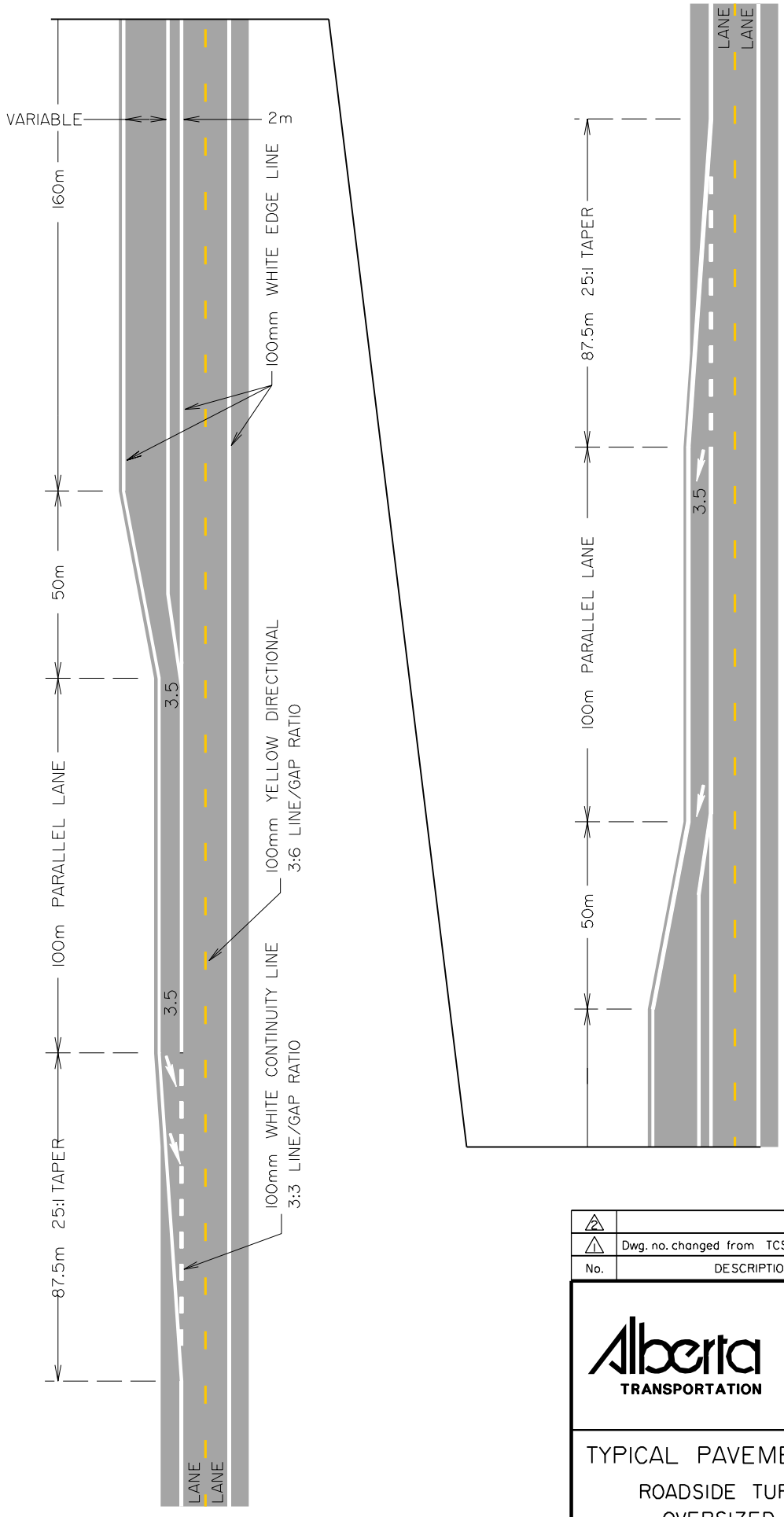
Alberta TRANSPORTATION

FIGURE
TCS-C-310

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
ROADSIDE TURNOUTS ON
RECREATIONAL ROADS

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C3



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-3.04	B.B.	Mar/03

Alberta TRANSPORTATION

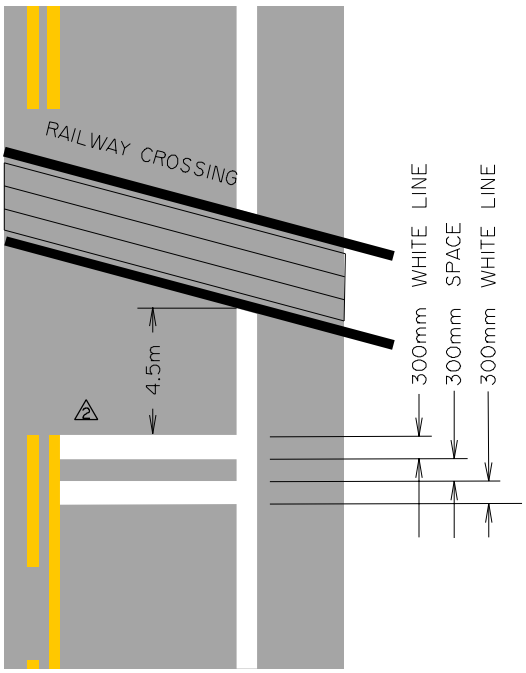
FIGURE
TCS-C-315

Date: MAY 1999

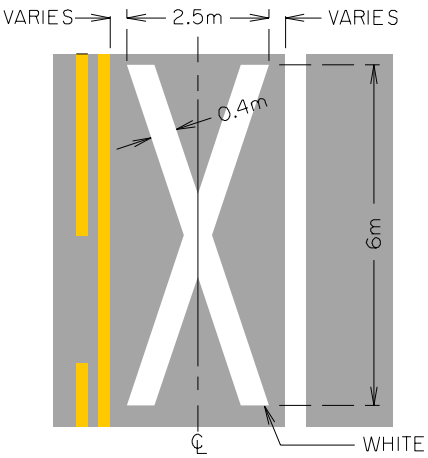
TYPICAL PAVEMENT MARKINGS

ROADSIDE TURNOUTS FOR OVERSIZED VEHICLES

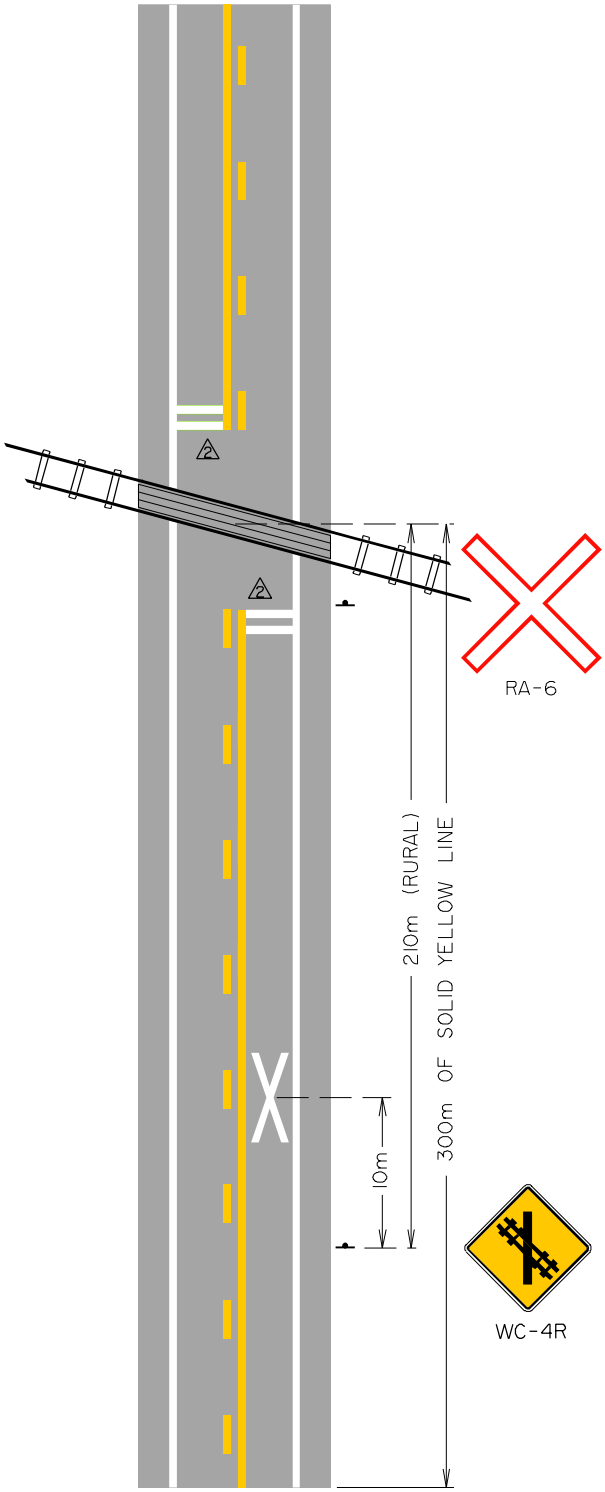
Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C3



STOP LINE



CROSSING MARKING



NOTES:

PAVEMENT MARKINGS AND SIGNING SHALL BE REPEATED FROM BOTH DIRECTIONS.

SIGHT DISTANCES ALONG TRACKS MUST BE CHECKED IN ALL CASES.

WIDTH MAY VARY ACCORDING TO LANE WIDTHS.

No.	DESCRIPTION	BY	DATE
2	Stop lines changed to be perpendicular to the direction of roadway	B.B.	Mar/03
1	Dwg. no. changed from TCS-C-3.05	B.B.	Mar/03

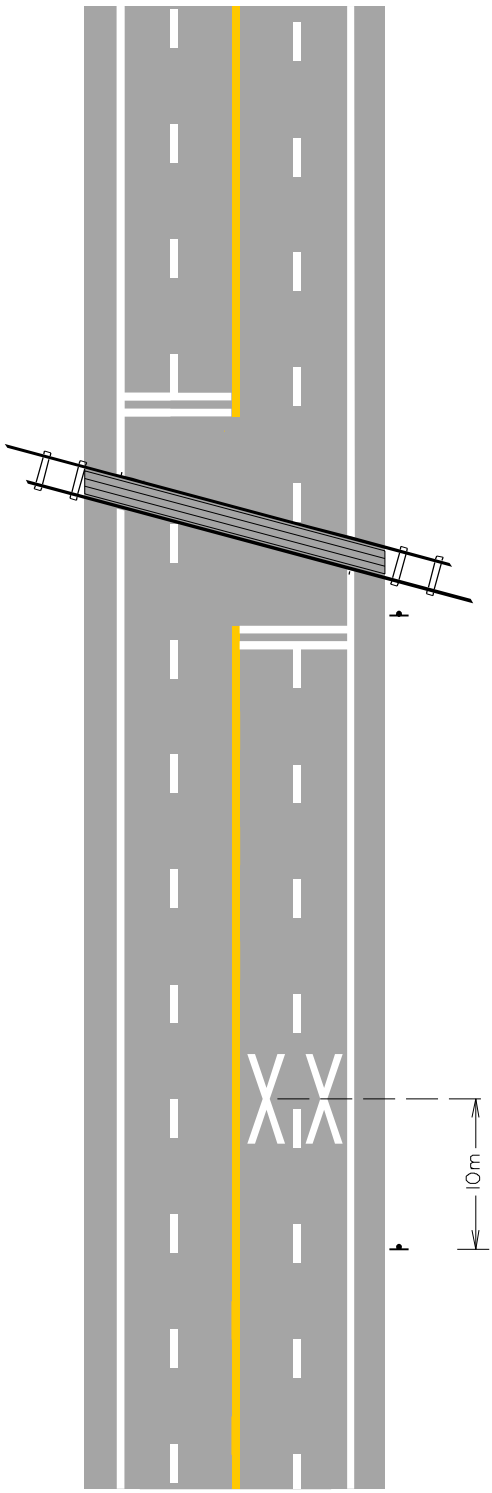
Alberta TRANSPORTATION

FIGURE
TCS-C-320

Date: JULY 2002

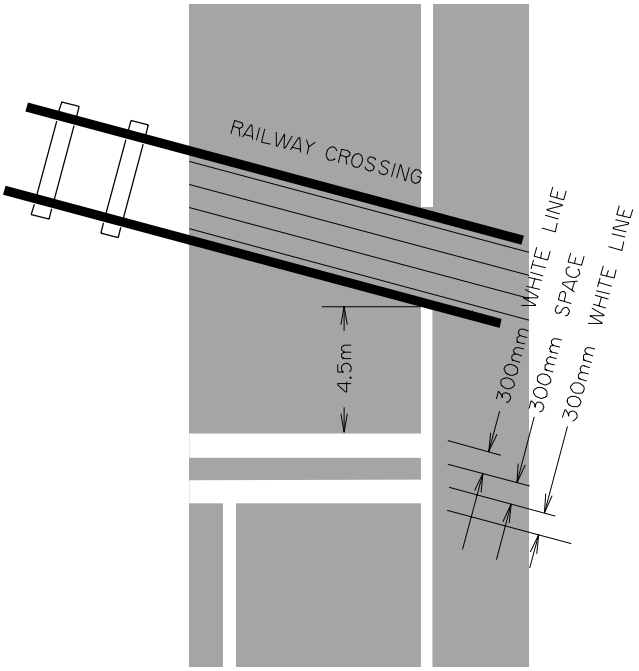
TYPICAL PAVEMENT MARKINGS FOR RURAL RAILWAY CROSSINGS

Prepared By: S.L.	Checked By: B.B.	Scale: N.T.S.	Section C3

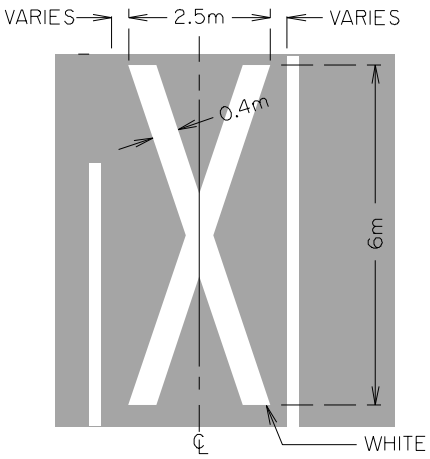


RA-6

WC-4R



STOP LINE



CROSSING MARKING

NOTES:

1. PAVEMENT MARKINGS AND SIGNING SHALL BE REPEATED FROM BOTH DIRECTIONS.
2. SIGHT DISTANCES ALONG TRACKS MUST BE CHECKED IN ALL CASES.
3. WIDTH MAY VARY ACCORDING TO LANE WIDTHS.
4. THE "X" MARKING IN URBAN AREAS SHALL BE INSTALLED ON ALL ROADWAYS POSTED AT 80 km/h OR MORE.
5. ON ROADWAYS POSTED LESS THAN 80 km/h, INSTALLATION OF THE "X" MARKING SHOULD BE BASED ON OPERATIONAL OR SAFETY CONCERNS.
6. THE EXACT LOCATION OF "X" MARKINGS WILL DEPEND ON THE PRESENCE OF INTERSECTIONS OR OTHER OBSTRUCTIONS IN ADVANCE OF STOP BARS.

No.	DESCRIPTION	BY	DATE
2			
1			

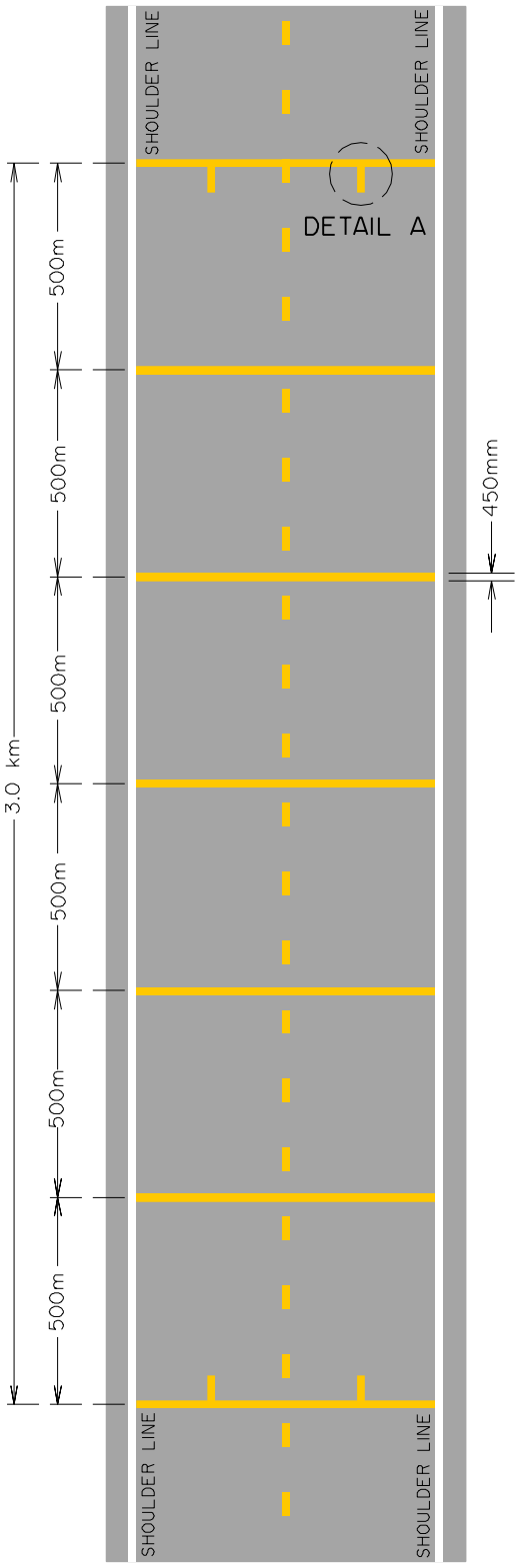
Alberta TRANSPORTATION

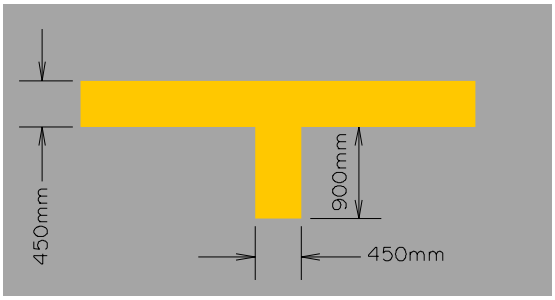
FIGURE
TCS-C-320.1

Date: MARCH 2003

TYPICAL PAVEMENT MARKINGS FOR URBAN RAILWAY CROSSINGS

Prepared By: S.L.	Checked By: B.B.	Scale: N.T.S.	Section C3





DETAIL A

AREA TO BE PAINTED

NOTES:

TO BE USED WHEN REQUESTED BY R.C.M.P. CONCURRENCE TO BE OBTAINED FROM OPERATIONS MANAGER.

ALL MARKINGS ARE TO BE YELLOW AND ARE NOT TO RECEIVE AN APPLICATION OF BEADS.

MARKINGS EXTEND BETWEEN THE SHOULDER LINES.

ONE SET OF MARKINGS INCLUDES TWO END MARKINGS AND FIVE MARKINGS AT 500 METRE INTERVALS.

CERTIFICATION OF MARKINGS REQUIRED UNDER LEGISLATION.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-3.06	B.B.	Mar/03

Alberta TRANSPORATION

FIGURE TCS-C-325

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
AIRCRAFT PATROL ZONE

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C3

C4 Symbols and Word Markings

C4.1 General

All symbol and word markings are to be white. To obtain uniformity and to prevent confusion, the use of symbols and word messages should be restricted to messages contained within this guide. Not more than two lines of pavement marking messages should be used.

C4.2 Arrow Symbols

Arrows are used to indicate vehicle movements permitted in a lane. The standard pavement arrows are shown in Figures TCS-C-401 and TCS-C-401.1.

C4.2.1 Types of Arrows

There are two types of arrow markings:

- Lane Designation Arrows
- Merge Arrows

Lane designation arrows are used at the approach to intersections to convey to the driver which lane should be used for each potential movement. These may consist of:

- left or right turn only and
- left/through or right/through

Straight through arrows may also be used if the movement is not obvious to drivers (e.g. when a roadway follows a curvilinear alignment).

Merge arrows are typically used at a lane termination to advise the drivers that they need to complete a merge manoeuvre.

The following locations may warrant use of merge arrows:

- High speed entrance ramps with parallel lane design.
- Long acceleration lanes with a parallel section exceeding 100 m in length.
- Termination of passing and climbing lanes.

The arrangement of lane designation arrows is shown in Figure TSC-C-405 and Figure TSC-C-405.1. The positions of merge arrows are shown in Figure TSC-C-410.

C4.2.2 Arrow Properties

There are three properties of arrow symbol markings. These are:

- size
- form
- arrangement

Size of Arrows

Arrows should be sized to reflect the design speed of the roadway. The driver observes the arrows at an oblique angle to the road, and therefore the arrow needs to be longer than if seen at a more perpendicular angle.

The arrows typically need to be longer, for higher design speeds, and in general, the size of arrows used in rural and urban situations should be as shown in Figures TCS-C-401 and TCS-C-401.1, respectively.

Forms of Arrows

Two arrow forms are defined:

- rural template arrow
- urban line arrow

The shape of the arrow used in any situation should be consistent on provincial highways.

In urban situations, where driving manouevers are complex, more arrows are used for lane designation and merging applications. Therefore, a compact and more easily applied line arrow shape may be adopted in urban situations to reduce costs.

It is often cost-effective and practical to use more durable materials for arrow markings. Durable materials such as thermoplastic or epoxy materials have longer service life and are suitable for urban applications where replacement and maintenance procedures are often difficult due to heavy pavement use.

Both these arrow forms are provided in Figures TCS-C-401 and TCS-C-401.1.

C4.2.3 Use of Arrows on Rural Roadways

Lane designation arrows are normally required along exclusive left or right turn lanes and adjacent combination through/turn lanes at complex rural intersections such as Type IV, Type V and log haul intersections.

Straight through only arrows are normally used at the engineer's discretion, where the geometry of the intersection dictates that there may be some confusion of lane allocation.

Lane designation arrows are typically spaced far enough back from the intersection to allow the driver to safely make the decision to change lanes.

Because of the climatic conditions in Alberta, the arrows may not always be seen, because they may be covered with snow. For lane designation and merge arrows, the roadway geometry itself, signage, and longitudinal pavement markings are the main indicators of a change in geometry. The pavement arrows serve to supplement this other information.

In general, arrows should be placed close to the change in geometry that they are supposed to warn the driver about. However, if they are placed too close, the driver will not have time to react to the change. On the other hand, if the arrows are placed too far away, the driver may forget them before the change is necessary. The driver must be provided with enough time to make a decision and make the manoeuvre.

The distance for the first arrow should be 30 m from the centreline of the intersection. A second arrow should be placed back 100 m from the first arrow for posted speed of 100 km/h or greater and 45 m for design speeds less than that.

C4.2.4 Use of Arrows on Urban Roadways

In urban areas, where speeds are generally lower and lighting is often provided, lane designation arrows are normally not required

Arrows in urban areas should only normally be considered in the following situations:

- Along exclusive left or right turn lanes and combination through/turn lanes at complex intersections along roadways, which are posted at 80 km/h or more.
- Along dual left turn lanes.
- Where the geometry of an intersection and lane allocation may be confusing to drivers.
- At high speed entrance ramps with parallel lane design where lighting has not been provided.

The distance for the first arrow should be 30 m from the centreline of the intersection. A second arrow should be placed back 100 m from the first arrow for posted speed of 100 km/h or greater and 45 m for design speeds less than that.

C4.3 Word Markings

Word and symbol markings may be used for the purpose of guiding, warning, or regulating traffic. They normally supplement standard signing. In general, word markings should be placed at locations where enhanced level of warning or guidance is needed.

Word pavement markings have definite limitations. They can be obscured by snow, may not be clearly visible when wet, and may not be durable when subjected to heavy traffic. In spite of these limitations, they have the advantage, under favorable conditions, of conveying warnings or information to the driver without diverting the motorists attention from the roadway.

The following factors should be considered in determining whether a word marking should be used along a highway:

- vehicular approach speeds from both directions
- vehicular volume and density
- vehicular turning movements
- roadway classification
- day and night visibility by motorists
- consistency with markings at adjacent intersections or within the same intersection.

Three types of pavement word markings are currently in use. They include *SCHOOL, STOP and STOP AHEAD*. The guidelines for use and placement of these word markings are included in the following sections.

C4.3.1 SCHOOL Word Markings

SCHOOL word markings should only be provided for a designated school zone. Normally, school zones located along high-speed rural highways will qualify for installation of word markings. School word markings are seldom installed in urban areas where running speeds are lower.

SCHOOL word markings should be installed for both directions of travel for rural school zones.

SCHOOL word markings are illustrated in Figure TCS-C-420.

C4.3.2 STOP and STOP AHEAD Word Markings

STOP and STOP AHEAD word markings may be used as an enhancement to the existing regulatory or warning devices at locations where high potential for collisions exists due to roadway geometric conditions or other operational or safety conditions.
In general, *STOP* word markings may be installed at intersections where all of the following conditions are present:

- The intersection has a history of at least three *Failing to Stop* type incidents or collisions over the period of five years.
- Traffic volumes on an approach exceeds 500 vehicles per day.
- Other safety measures such as oversize *STOP* sign and *STOP AHEAD* sign have already been provided and have not been effective in eliminating *Failing to Stop* type of collisions.

STOP word marking are installed 1.5 m in advance of a painted Stop bar as shown in TCS-C-430.

STOP AHEAD word markings may be installed at intersections when *STOP* word markings are used and *STOP AHEAD* warning sign is present.

STOP AHEAD markings are suitable for approaches with reduced visibility due to sharp horizontal curves, steep uphill grades with sharp vertical curves or other roadway conditions, which may cause sight distance restrictions.

STOP AHEAD word markings are installed 150 m to 200 m in advance of the intersection at a Stop Ahead sign. *STOP AHEAD* word markings are illustrated in Figure TCS-C-425.

C4.3.3 Placement Details

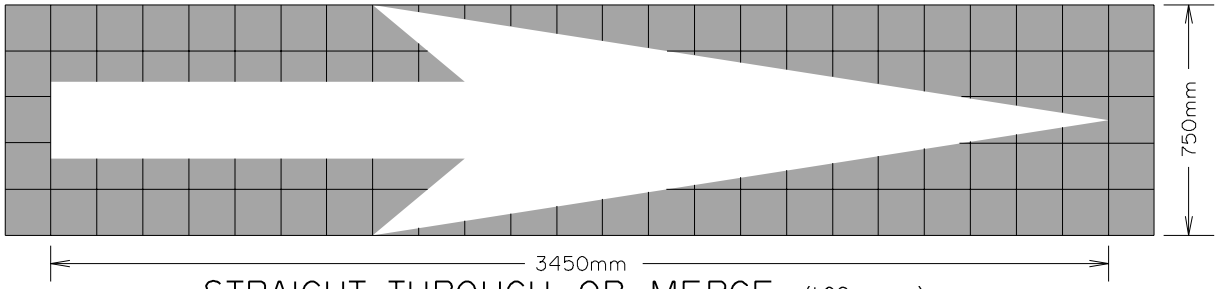
Letters making up words shall be elongated to allow for the perspective of the driver.

Where the speed limit is higher than 70 km/h, letters should be 2400 mm in length. Messages containing more than one line should be placed so that the word nearest the approaching traffic contains the beginning of the message. The lines should be separated by a distance of four to six times the height of the letters used.

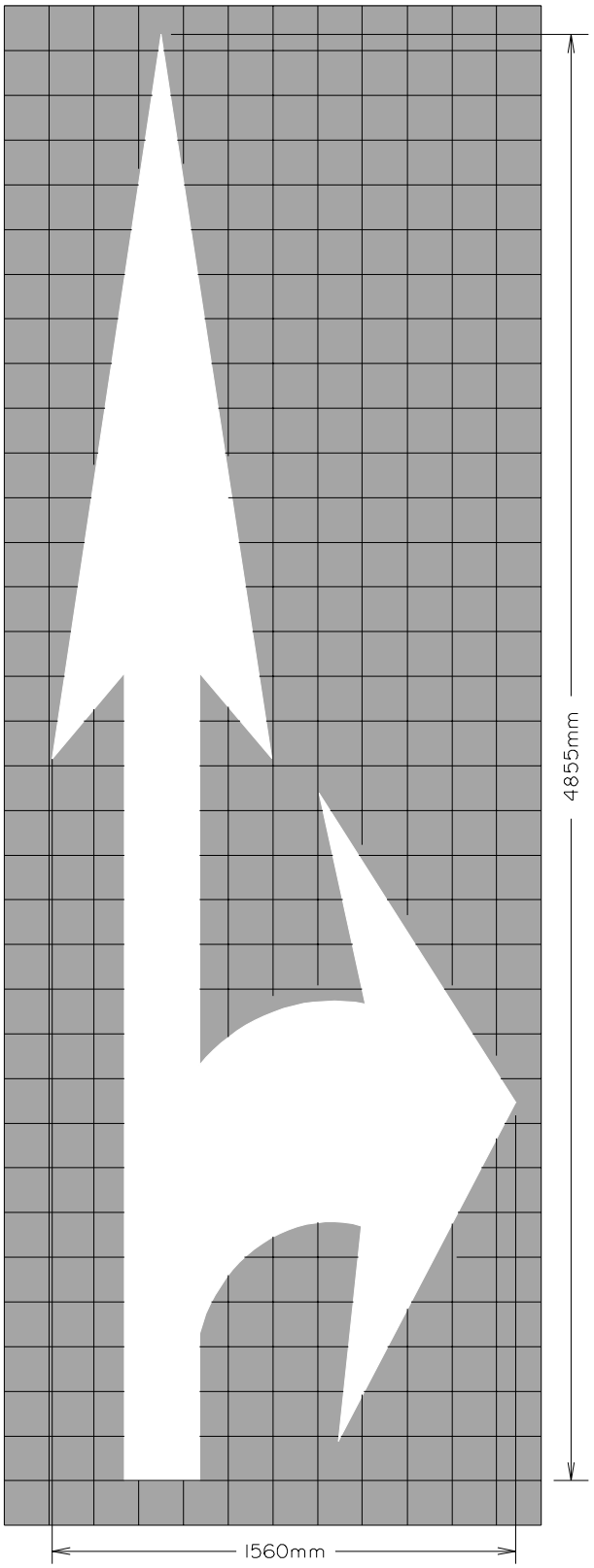
Where the speed limit is equal to or less than 70 km/h, the length of the letters used may be reduced to 1800 mm, and the lines should be separated by a distance equal to twice the height of the letters used. In such locations the line farthest from the approaching traffic may contain the beginning of the message.

Elongated alphabets for 1800 mm and 2400 mm letters are illustrated in Figures TCS-C-415 to 415.7, with detailed dimensions and areas for each numeral and letter.

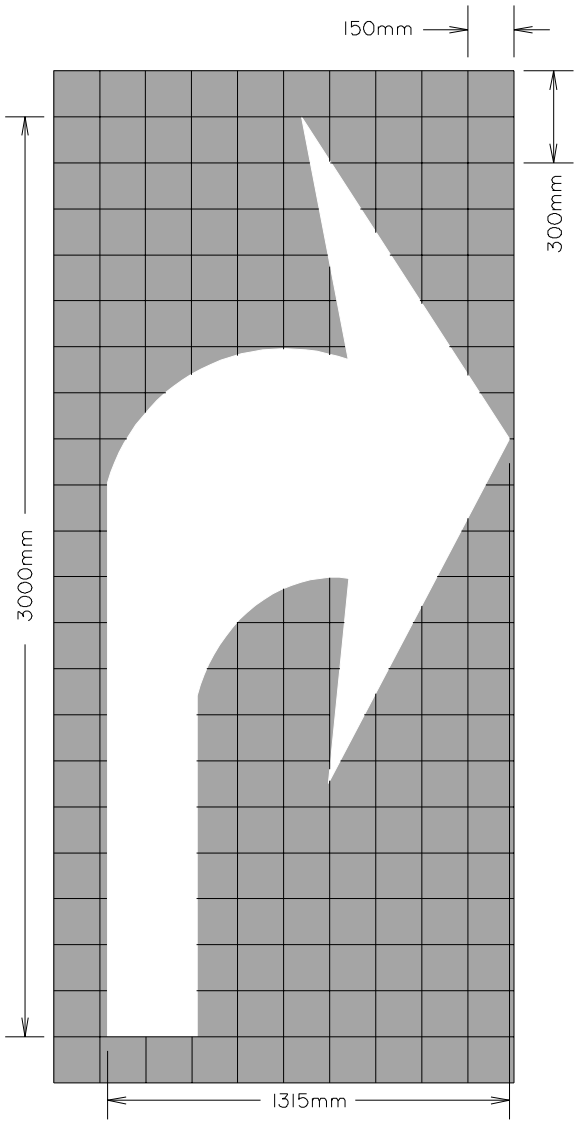
A special case of word markings is *SCHOOL* marking for use in school zones. This will not fit within a 3.7 m pavement width with standard letter sizes. Therefore compact letter sizes have been developed for this message. This is shown in Figure TCS-C-420.



STRAIGHT THROUGH OR MERGE (1.09 sq m)



STRAIGHT THROUGH/RIGHT TURN
(2.37 sq m)



RIGHT TURN ONLY (1.53 sq m)

NOTE:
ARROWS TO BE PAINTED WHITE.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.01	B.B.	Mar/03

Alberta TRANSPORTATION

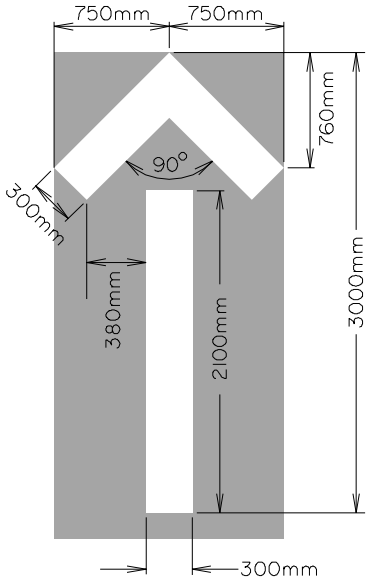
FIGURE
TCS-C-401

Date: MAY 1999

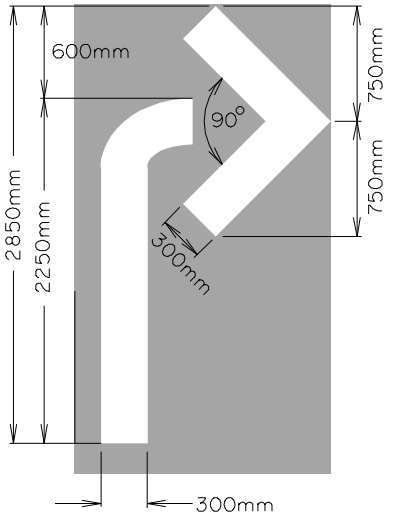
TYPICAL PAVEMENT MARKINGS
MARKING MESSAGES
RURAL ARROWS

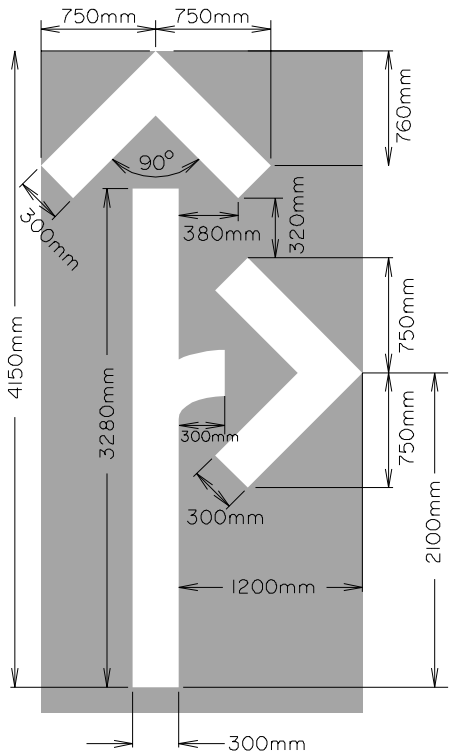
Prepared By: R.M.	Checked By: S.M.	Scale: N.T.S.	Section C4

STRAIGHT THROUGH
(1.78 sq m)

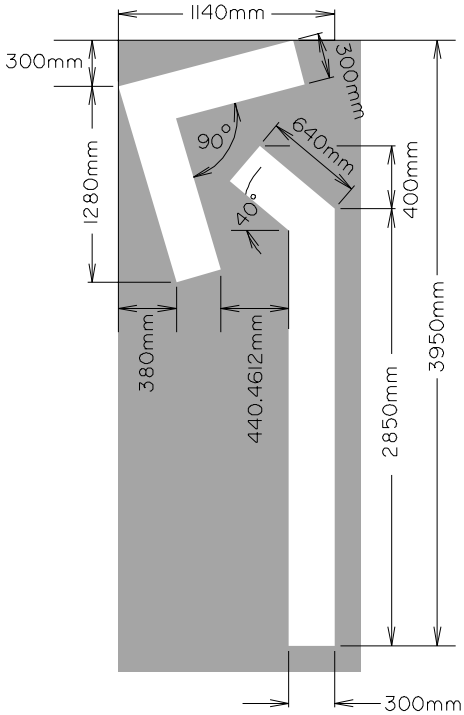


RIGHT TURN ONLY
(1.26 sq m)





STRAIGHT THROUGH/RIGHT TURN
(2.16 sq m)



LEFT MERGE
(1.67 sq m)

NOTE:
ARROWS TO BE PAINTED WHITE.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.02	B.B.	Mar/03

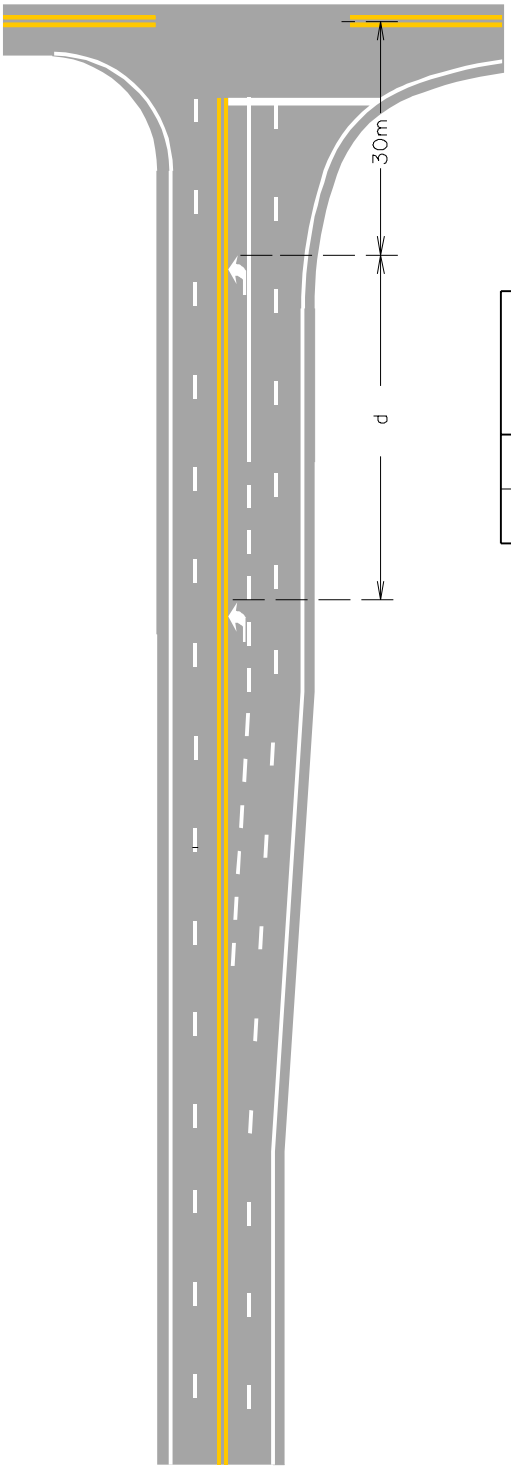
Alberta TRANSPORTATION

FIGURE
TCS-C-401.1

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
MARKING MESSAGES
URBAN ARROWS

Prepared By: R.M.	Checked By: S.M.	Scale: N.T.S.	Section C4



CONTINUED

POSTED SPEED (km/h)	DISTANCE BETWEEN ARROWS (d) (m)
< 100	45
≥ 100	100

No.	DESCRIPTION	BY	DATE
2			
1			

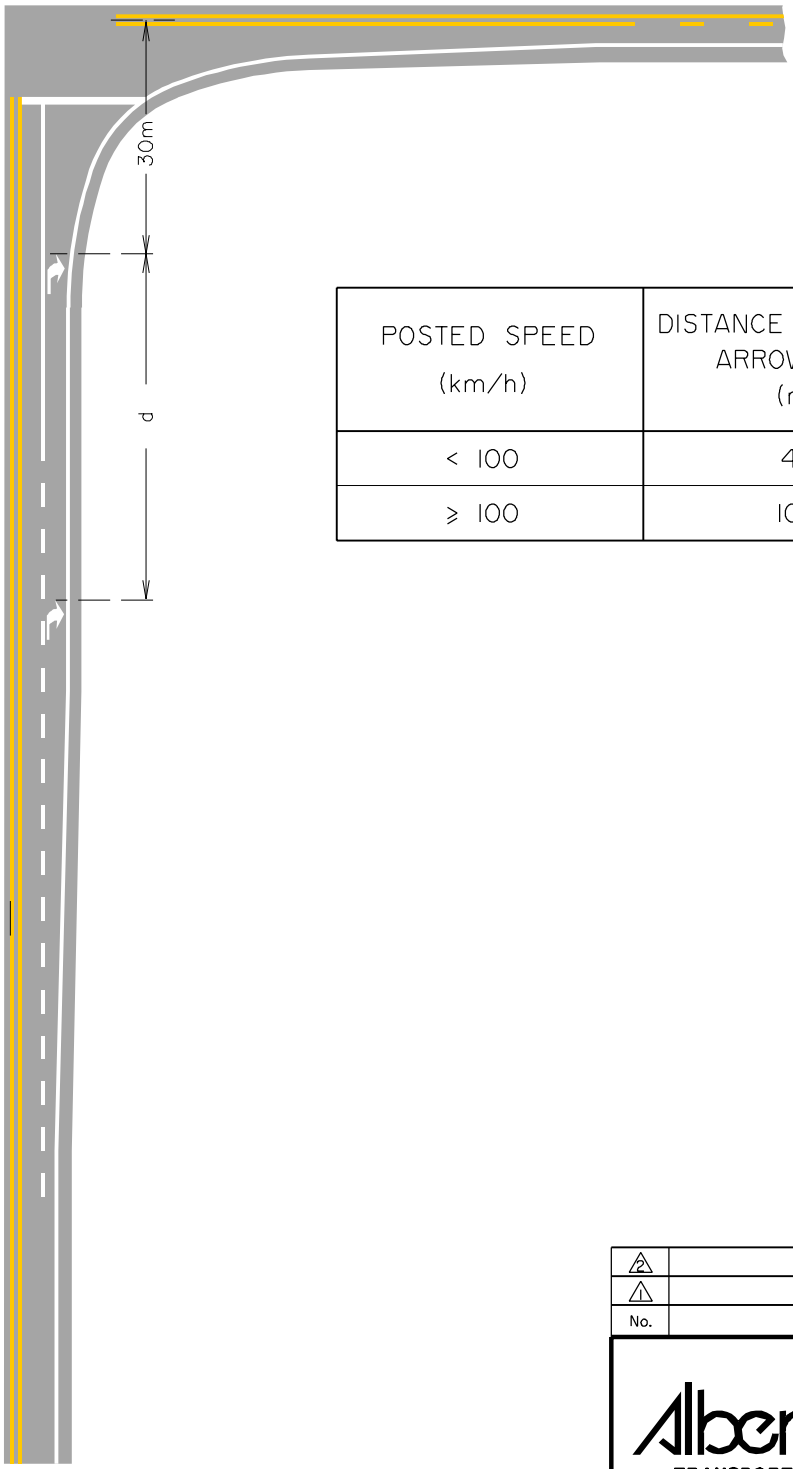
Alberta TRANSPORTATION

FIGURE
TCS-C-405

Date: MARCH 2003

TYPICAL PAVEMENT MARKINGS
FOR LEFT TURN LANE
AT URBAN INTERSECTION

Prepared By: S.L.	Checked By: B.B.	Scale: N.T.S.	Section C4



POSTED SPEED (km/h)	DISTANCE BETWEEN ARROWS (d) (m)
< 100	45
≥ 100	100

No.	DESCRIPTION	BY	DATE
2			
1			

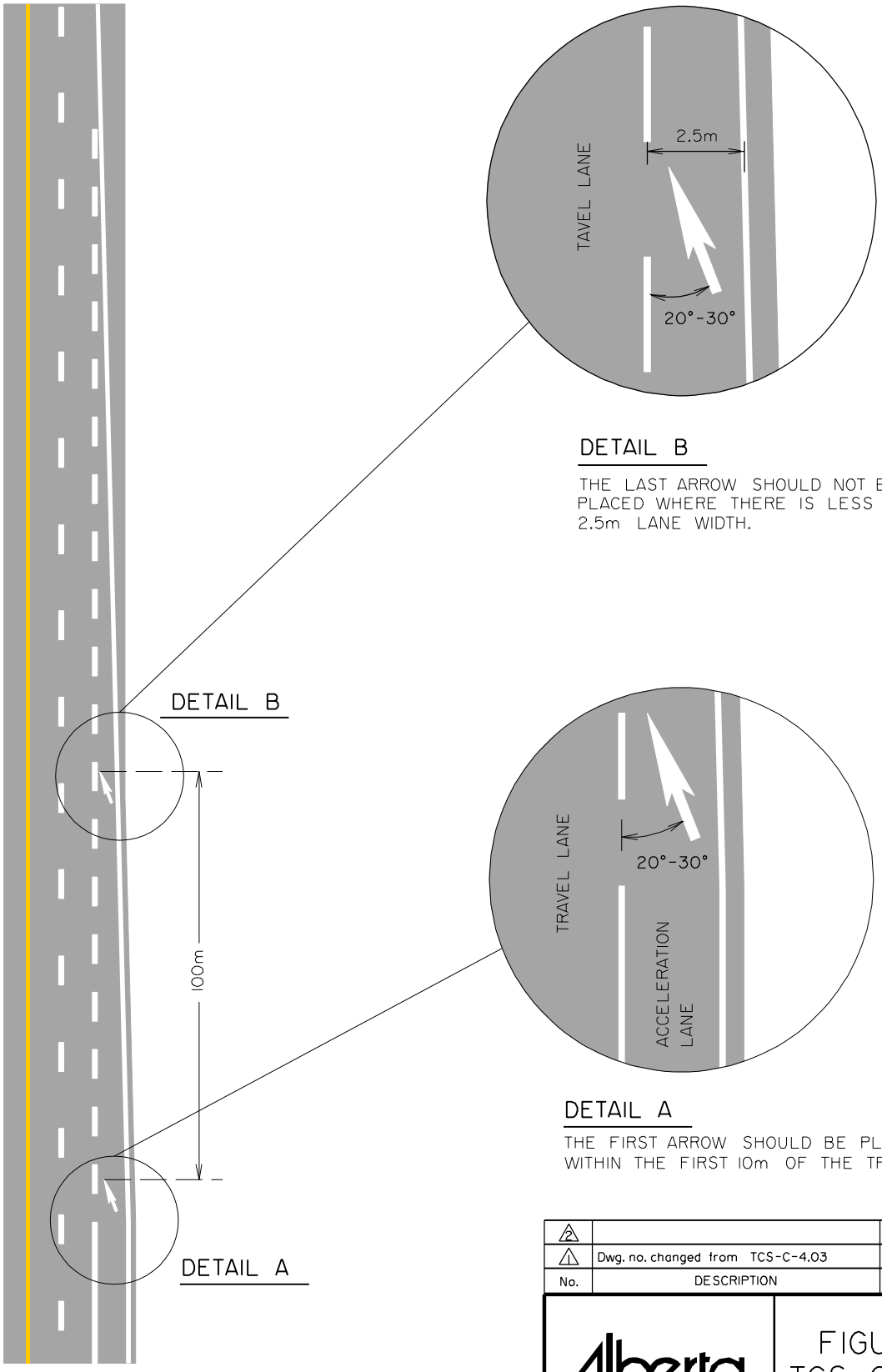
Alberta TRANSPORTATION

FIGURE
TCS-C-405.1

Date: MARCH 2003

TYPICAL PAVEMENT MARKINGS FOR RIGHT TURN LANE AT URBAN INTERSECTION

Prepared By: S.L.	Checked By: B.B.	Scale: N.T.S.	Section C4



DETAIL B

THE LAST ARROW SHOULD NOT BE PLACED WHERE THERE IS LESS THAN 2.5m LANE WIDTH.

DETAIL A

THE FIRST ARROW SHOULD BE PLACED WITHIN THE FIRST 10m OF THE TRANSITION.

NOTE:

EACH LOCATION WILL REQUIRE ASSESSMENT AND JUDGEMENT. THE ENGINEER WILL DETERMINE THE OPTIMUM LOCATION AND NUMBER OF ARROWS.
DISTANCES AND ARRANGEMENT MAY HAVE TO BE ADJUSTED.
ALL ARROWS SHALL BE PLACED AT THE SAME ANGLE.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.03	B.B.	Mar/03

Alberta TRANSPORTATION

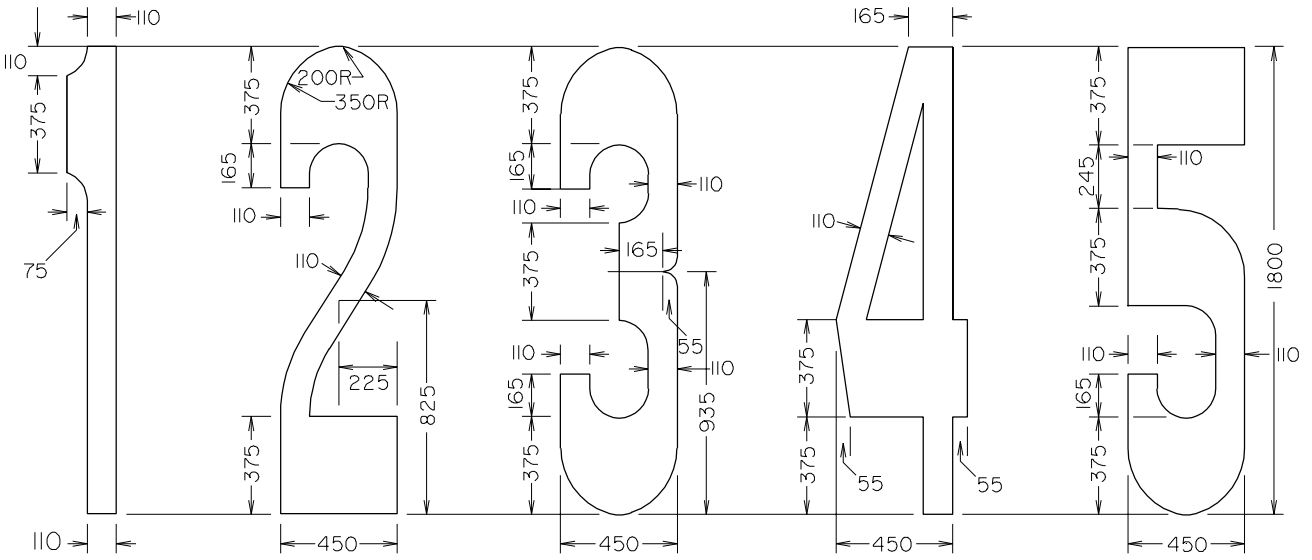
FIGURE TCS-C-410

Date: MAY 1999

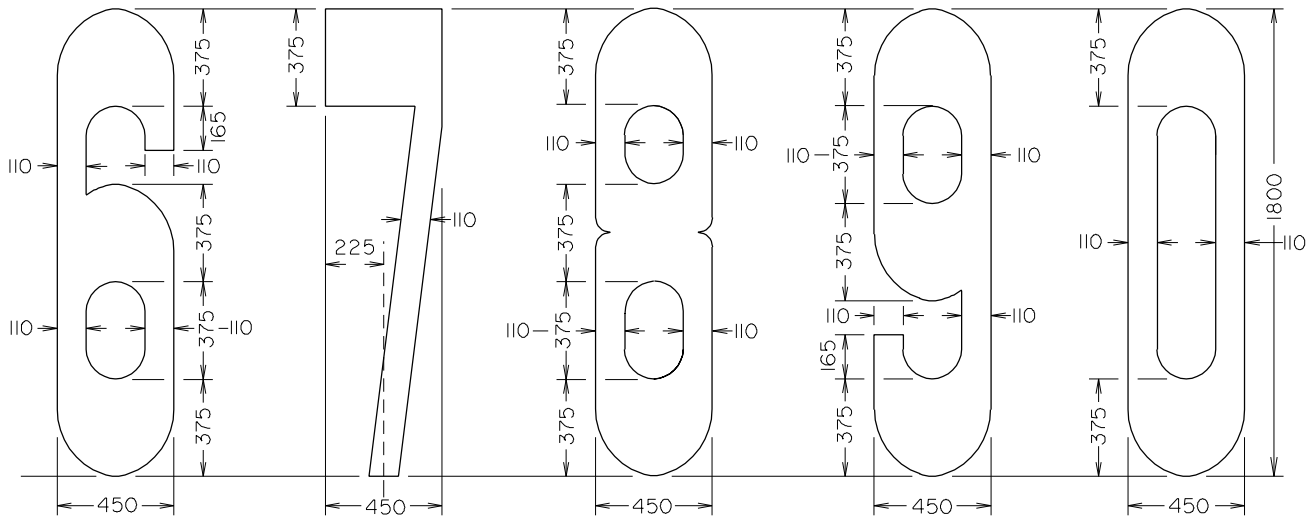
TYPICAL PAVEMENT MARKINGS

MARKING MESSAGES MERGE ARROWS

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C4



0.23 sq m | 0.46 sq m | 0.50 sq m | 0.46 sq m | 0.57 sq m



0.59 sq m | 0.33 sq m | 0.62 sq m | 0.59 sq m | 0.53 sq m

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.04	B.B.	Mar/03

Alberta TRANSPORTATION

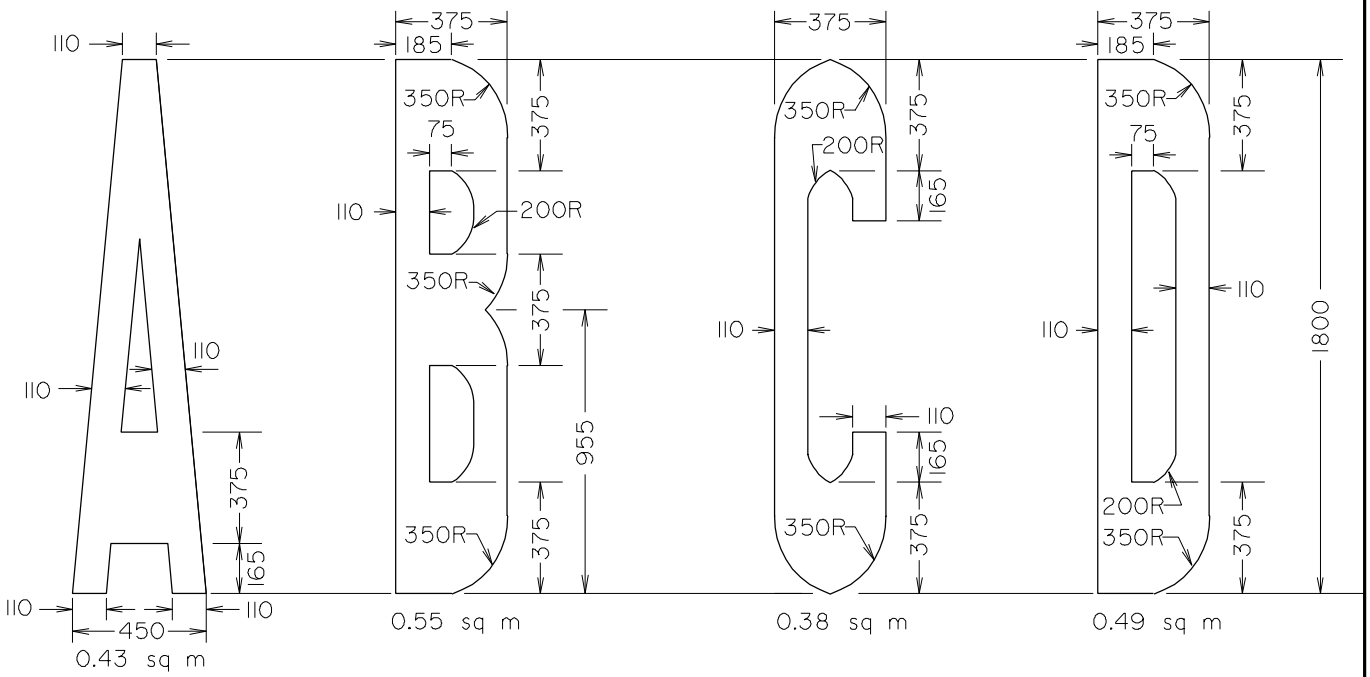
FIGURE TCS-C-415

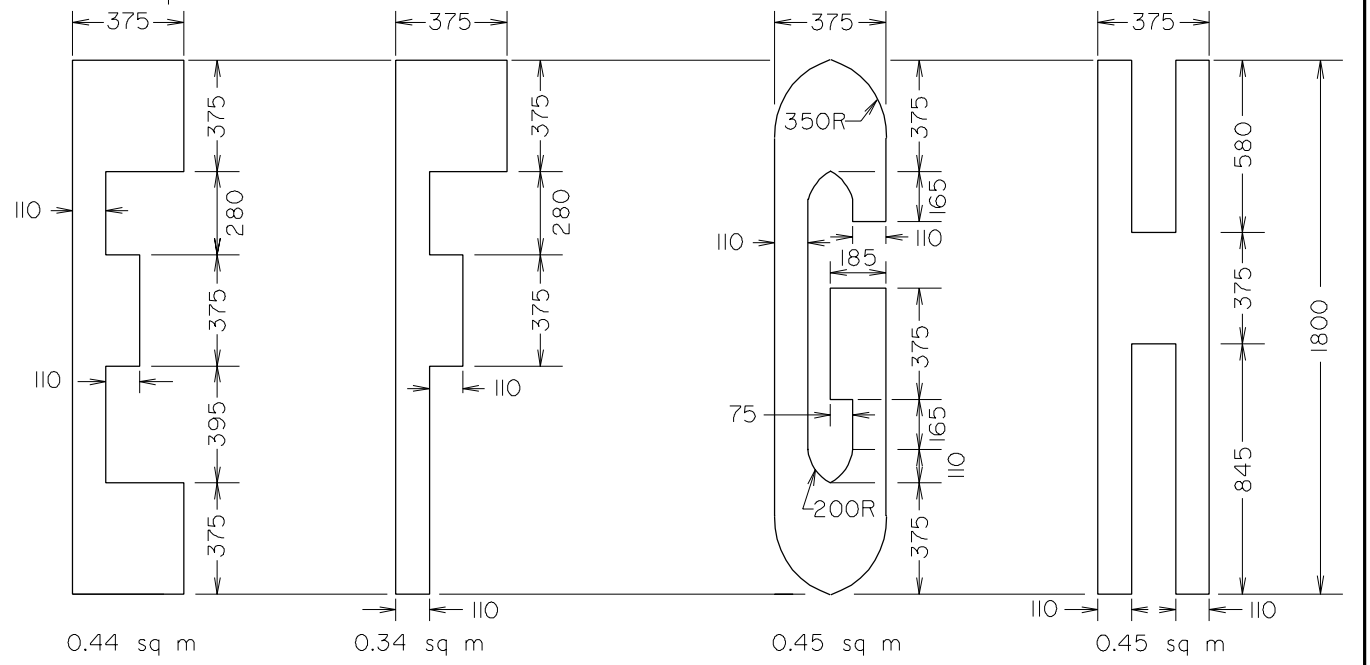
Date: MAY 1999

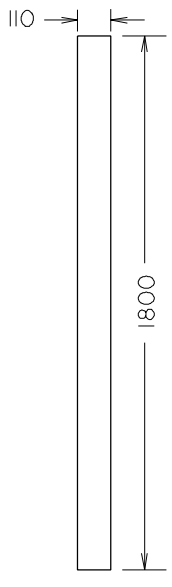
TYPICAL PAVEMENT MARKINGS

NUMERALS 0 TO 9 (URBAN)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	PAGE C4-9







No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.05	B.B.	Mar/03

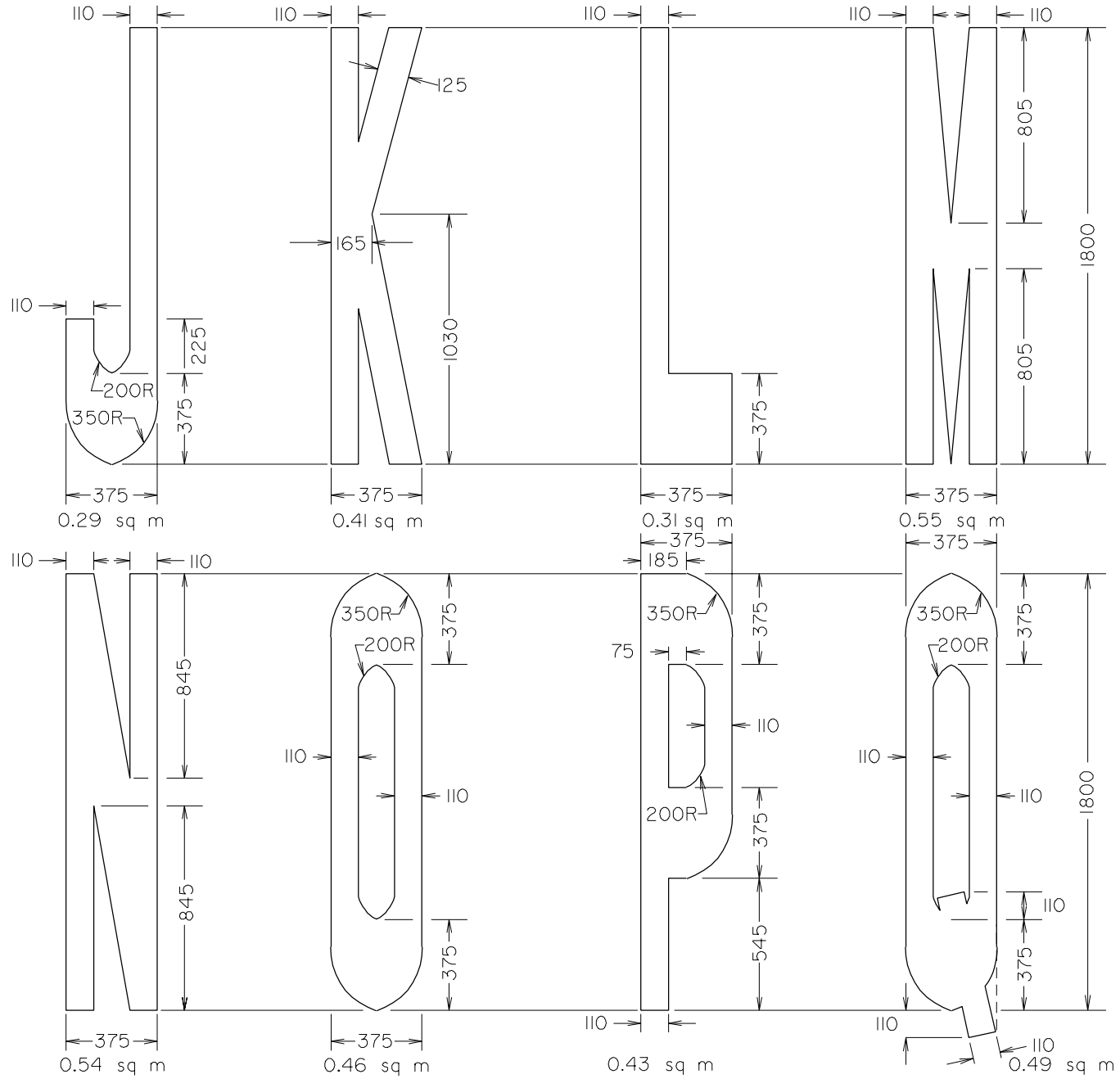
Alberta TRANSPORTATION

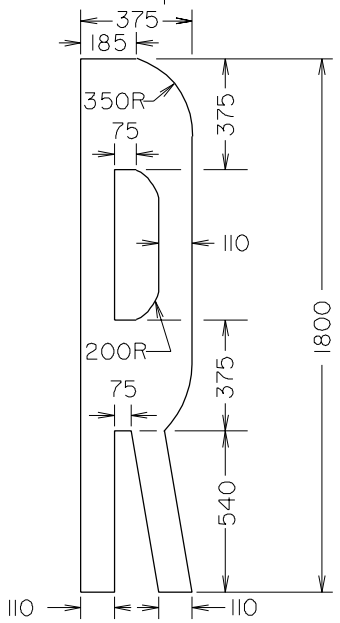
FIGURE TCS-C-415.1

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LETTERS A-I (URBAN)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C4





No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.06	B.B.	Mar/03

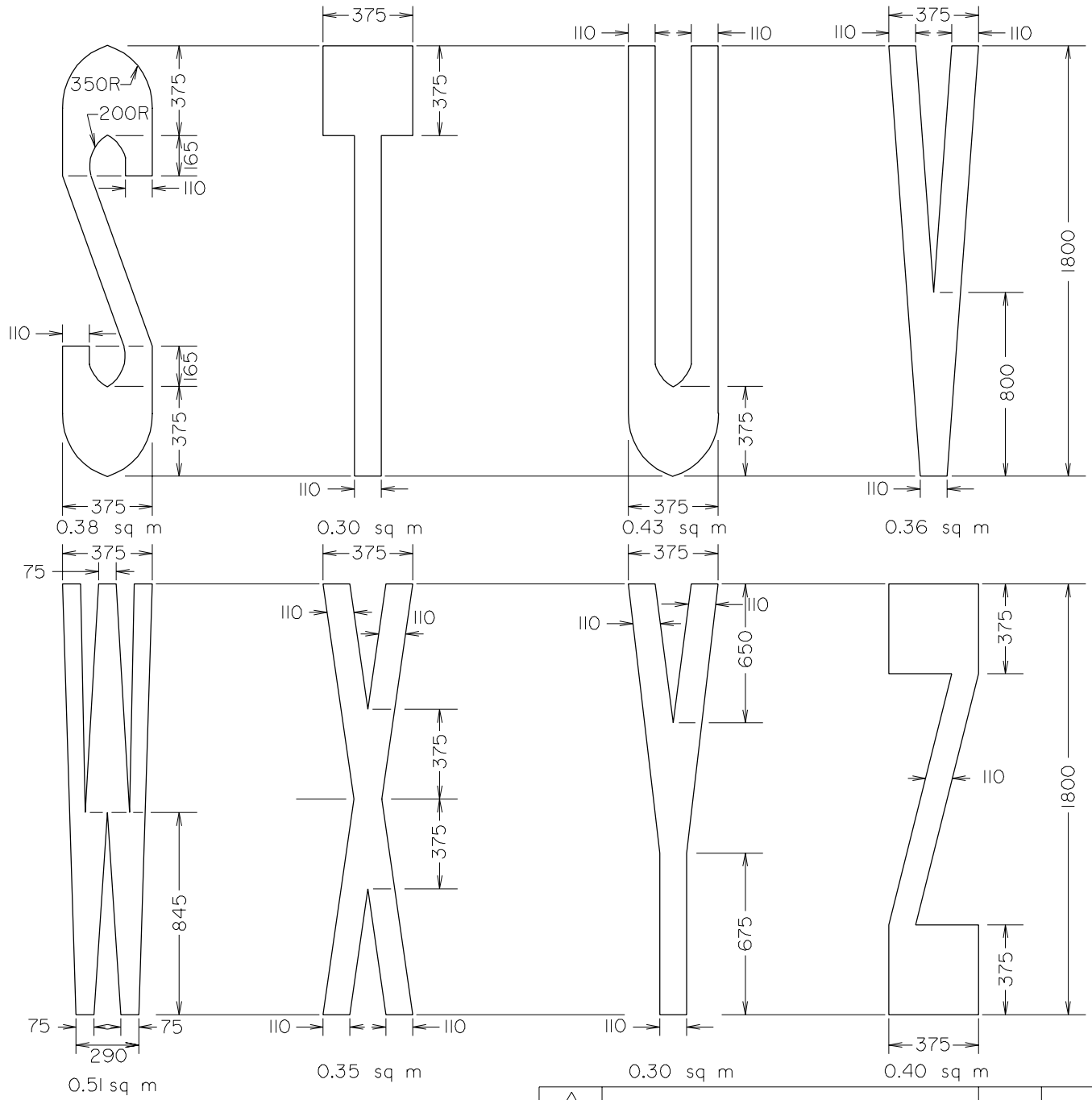
Alberta TRANSPORTATION

FIGURE
TCS-C-415.2

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LETTERS J-R (URBAN)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C4



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.07	B.B.	Mar/03

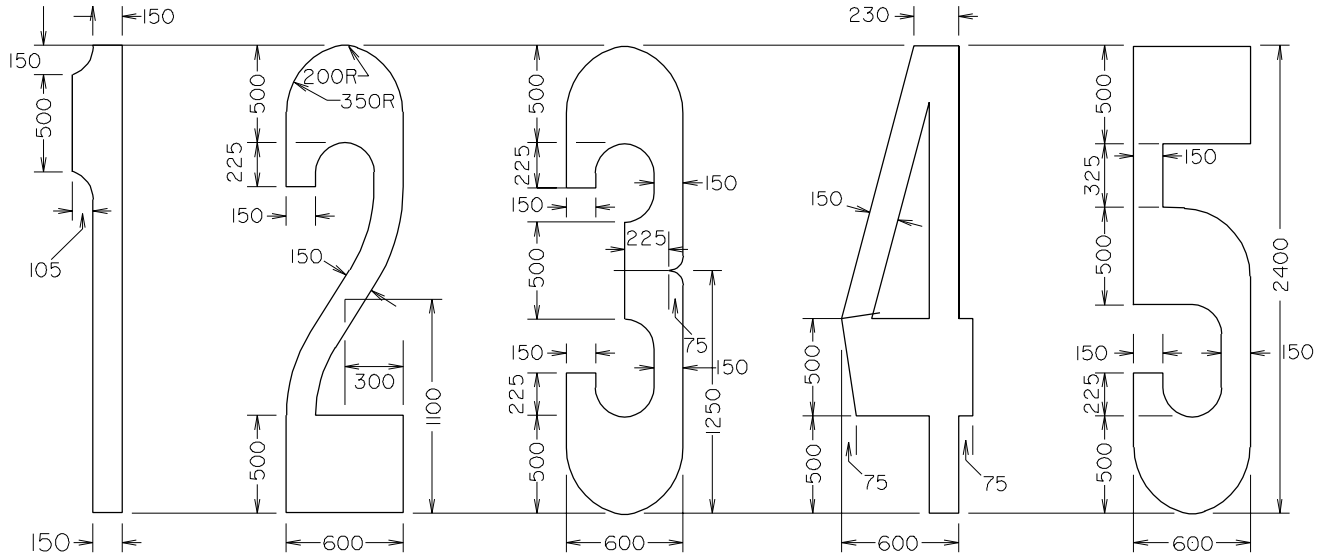
Alberta TRANSPORTATION

FIGURE TCS-C-415.3

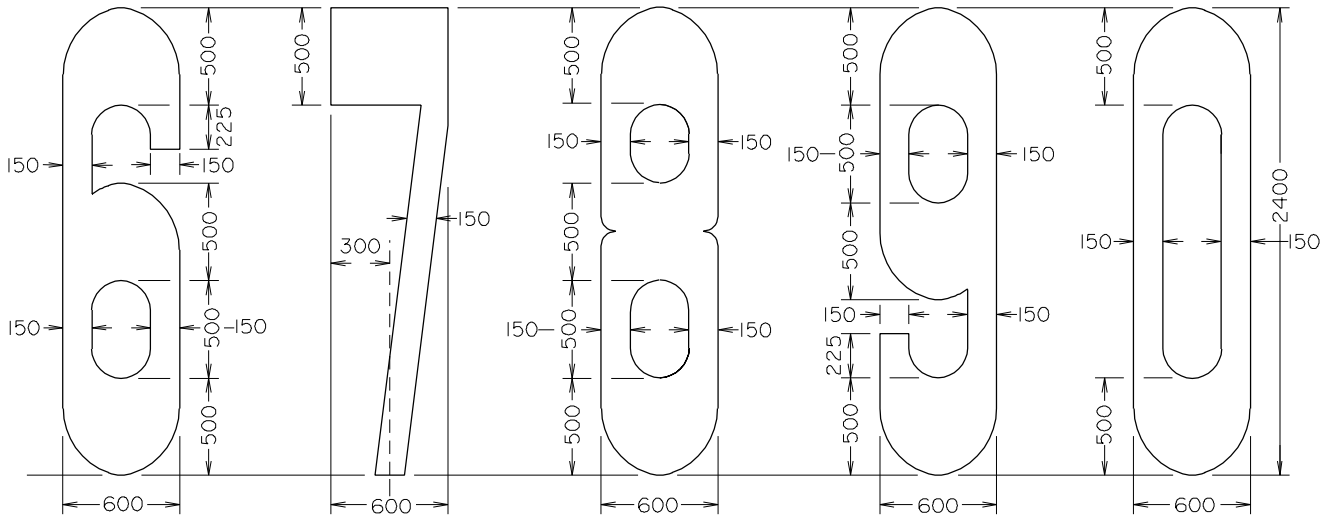
Date: MAY 1999

TYPICAL PAVEMENT MARKINGS LETTER S-Z (URBAN)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C4



0.42 sq m | 0.82 sq m | 0.88 sq m | 0.81 sq m | 1.01 sq m



1.05 sq m | 0.59 sq m | 1.11 sq m | 0.94 sq m | 0.81 sq m

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.08	B.B.	Mar/03

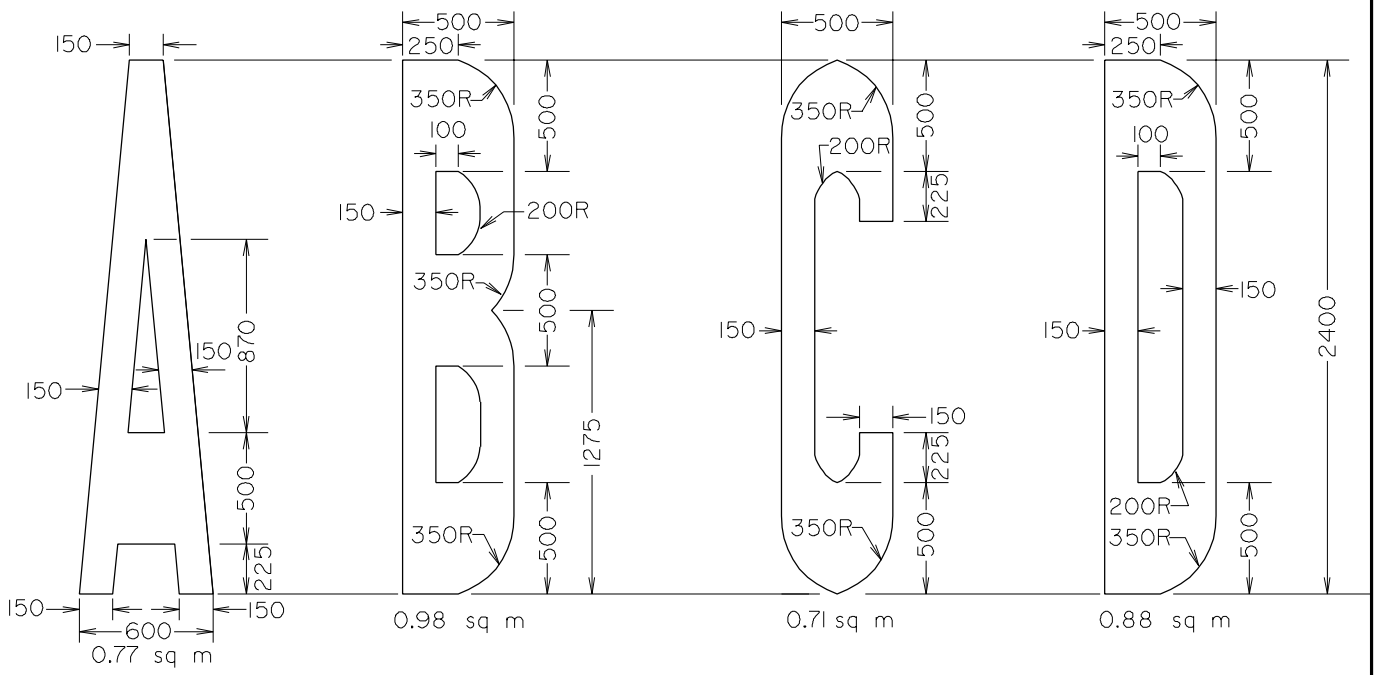
Alberta TRANSPORTATION

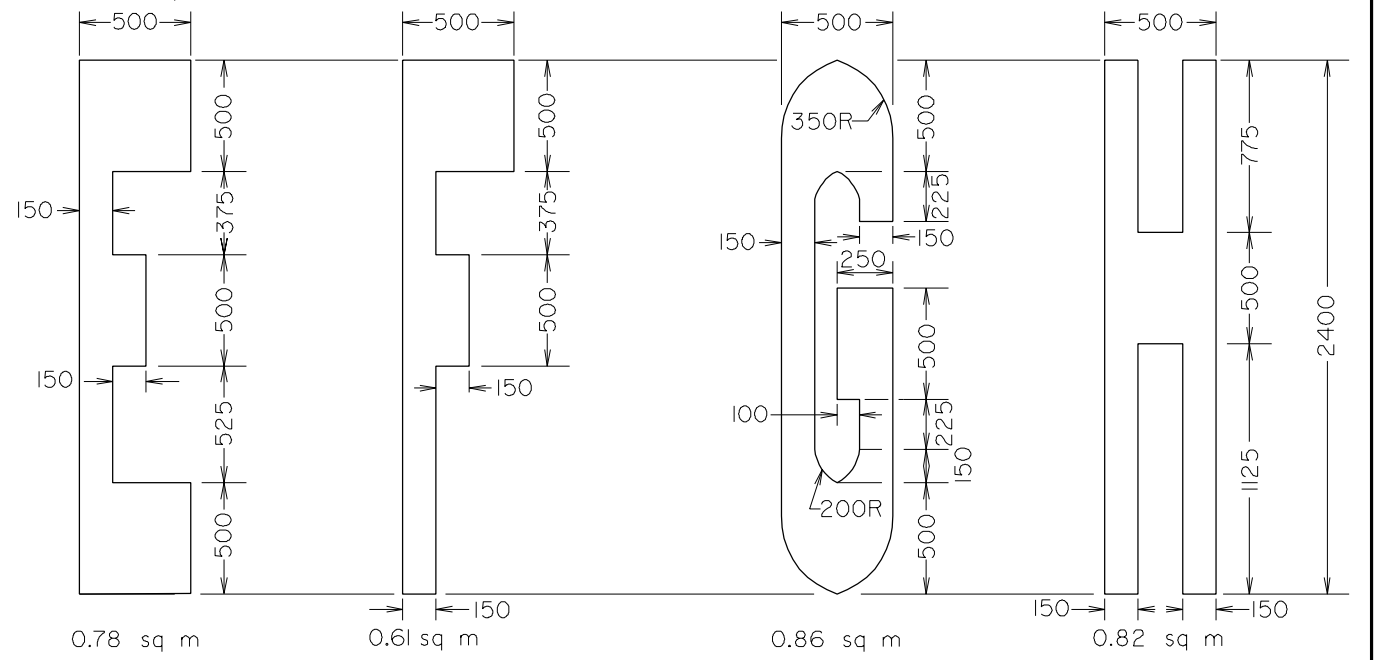
FIGURE
TCS-C-415.4

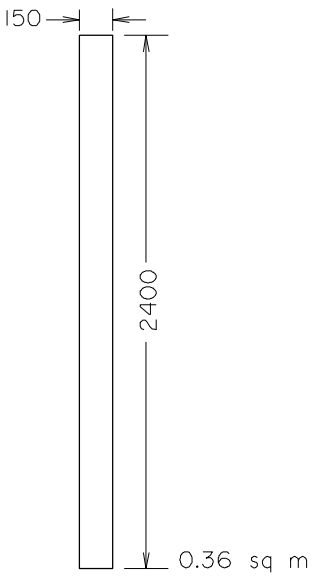
Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
NUMERALS 0 TO 9 (RURAL)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C4







No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.09	B.B.	Mar/03

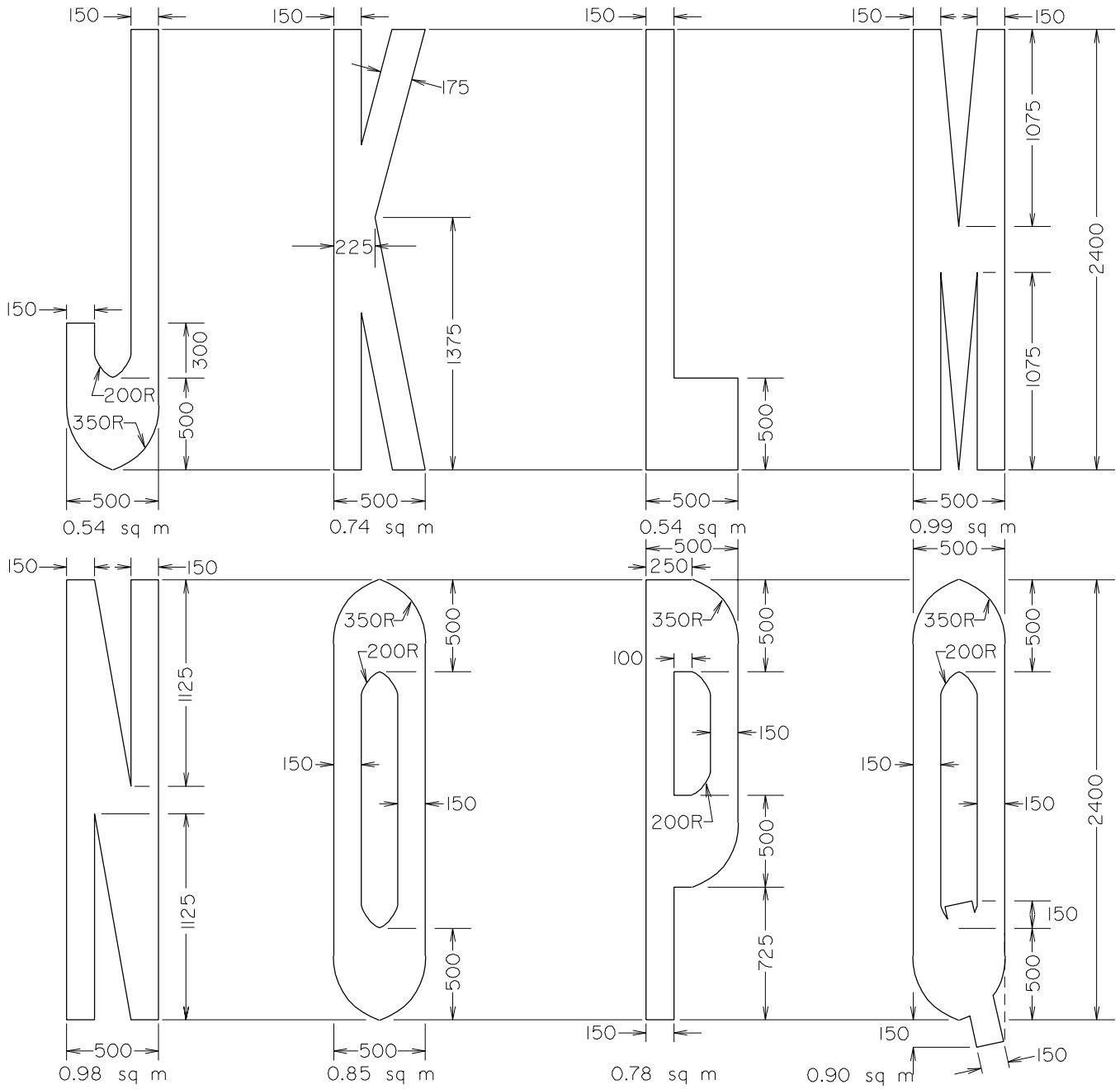
Alberta TRANSPORTATION

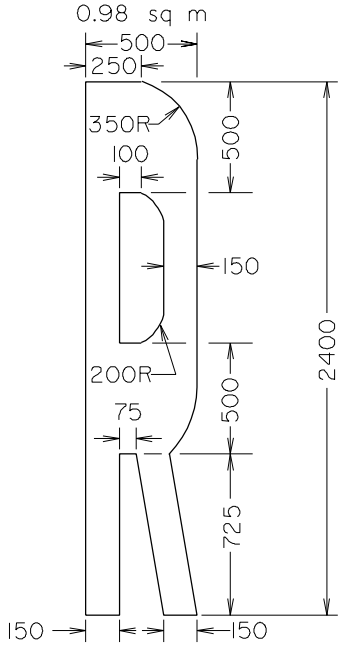
FIGURE TCS-C-415.5

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LETTERS A-I (RURAL)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C4





No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.10	B.B.	Mar/03

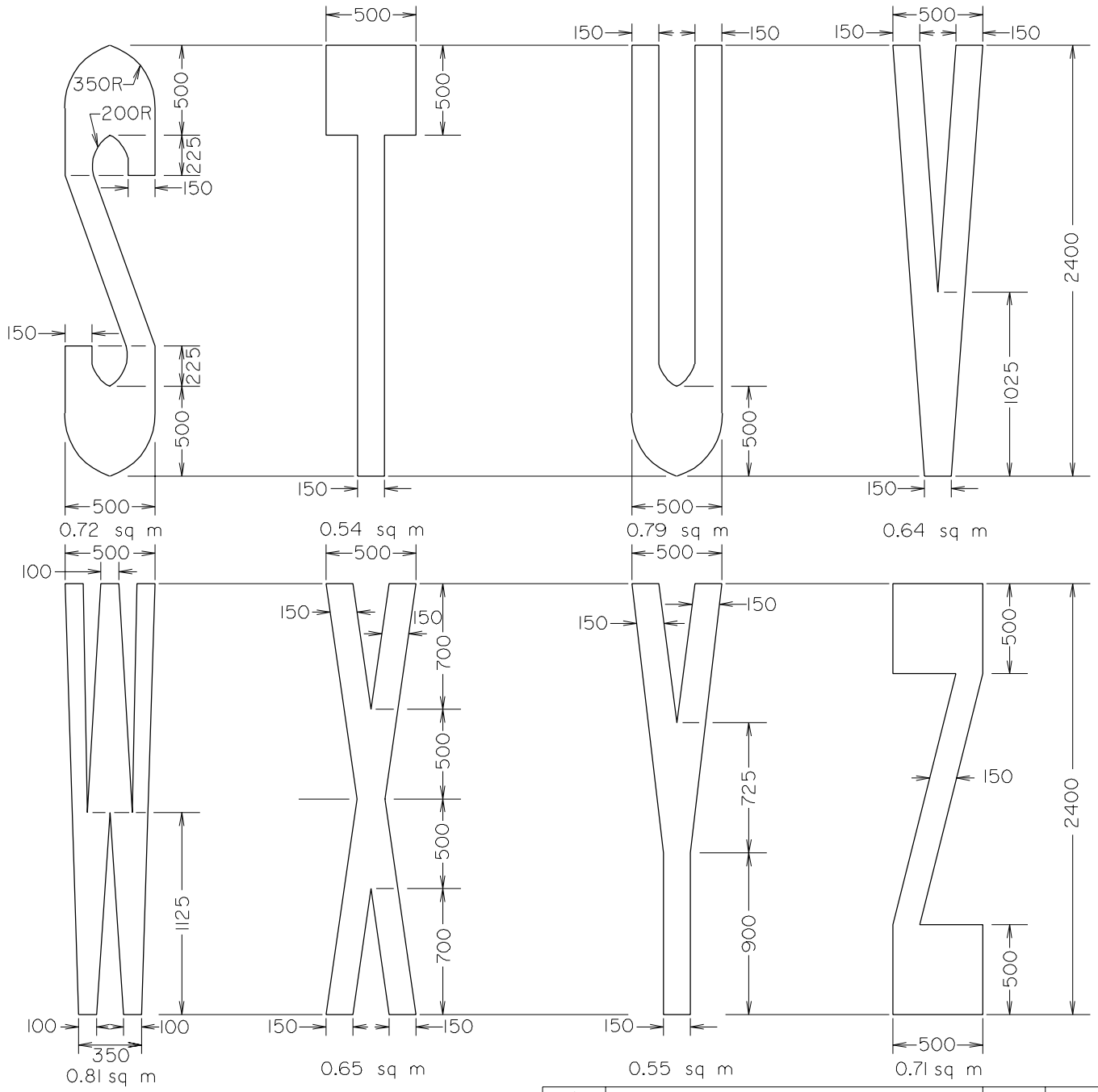
Alberta TRANSPORTATION

FIGURE TCS-C-415.6

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LETTERS J-R (RURAL)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C4



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.11	B.B.	Mar/03

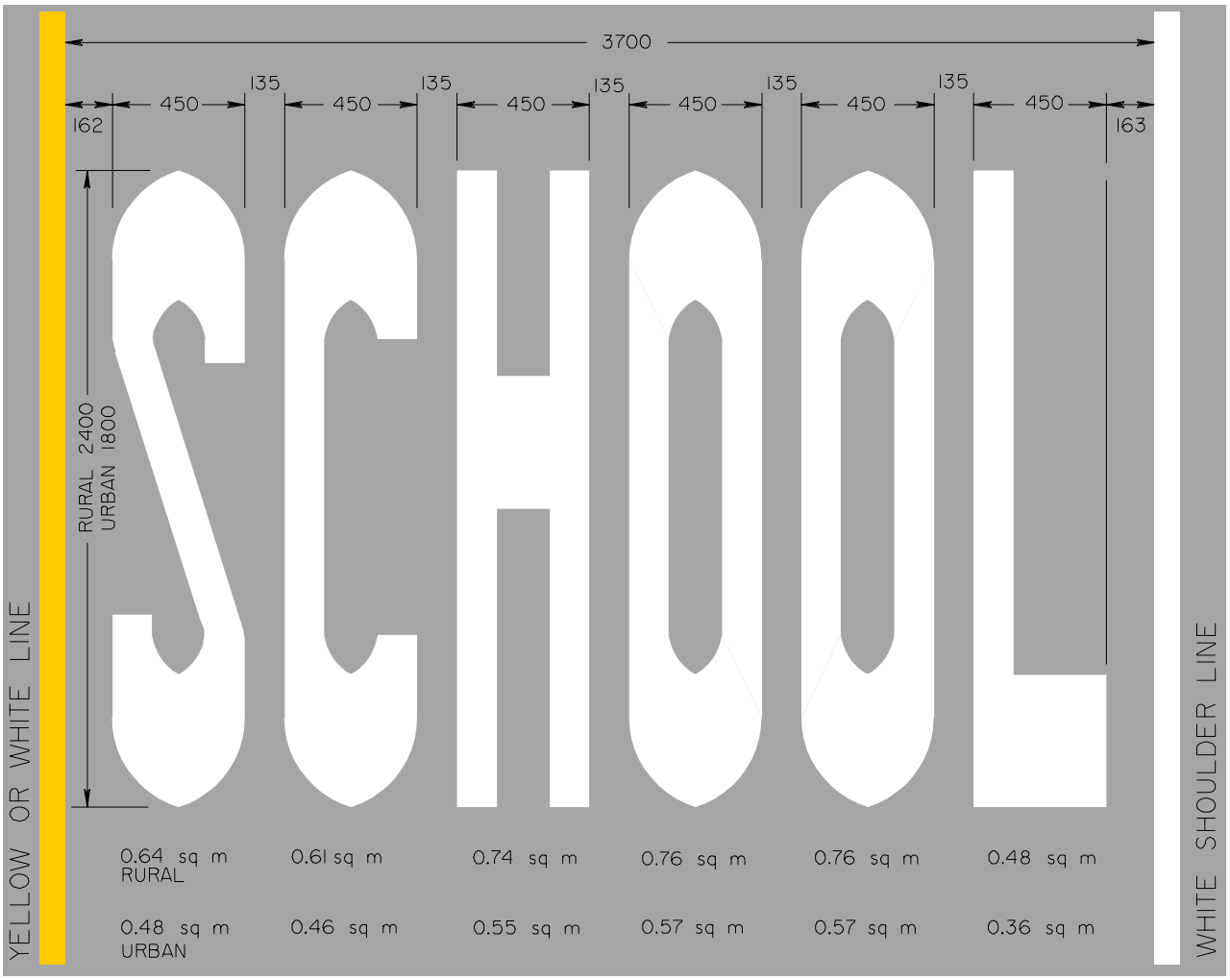
Alberta TRANSPORTATION

FIGURE TCS-C-415.7

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LETTERS S-Z (RURAL)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C4



NOTES:

MESSAGE TO BE PAINTED WHITE.

ALL DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE INDICATED.

SPECIAL WIDTH LETTERS USED IN "SCHOOL" MARKING.

AREA OF WORD "SCHOOL" IS 3.99m^2 (RURAL)
AND 2.99m^2 (URBAN).

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.12	B.B.	Mar/03

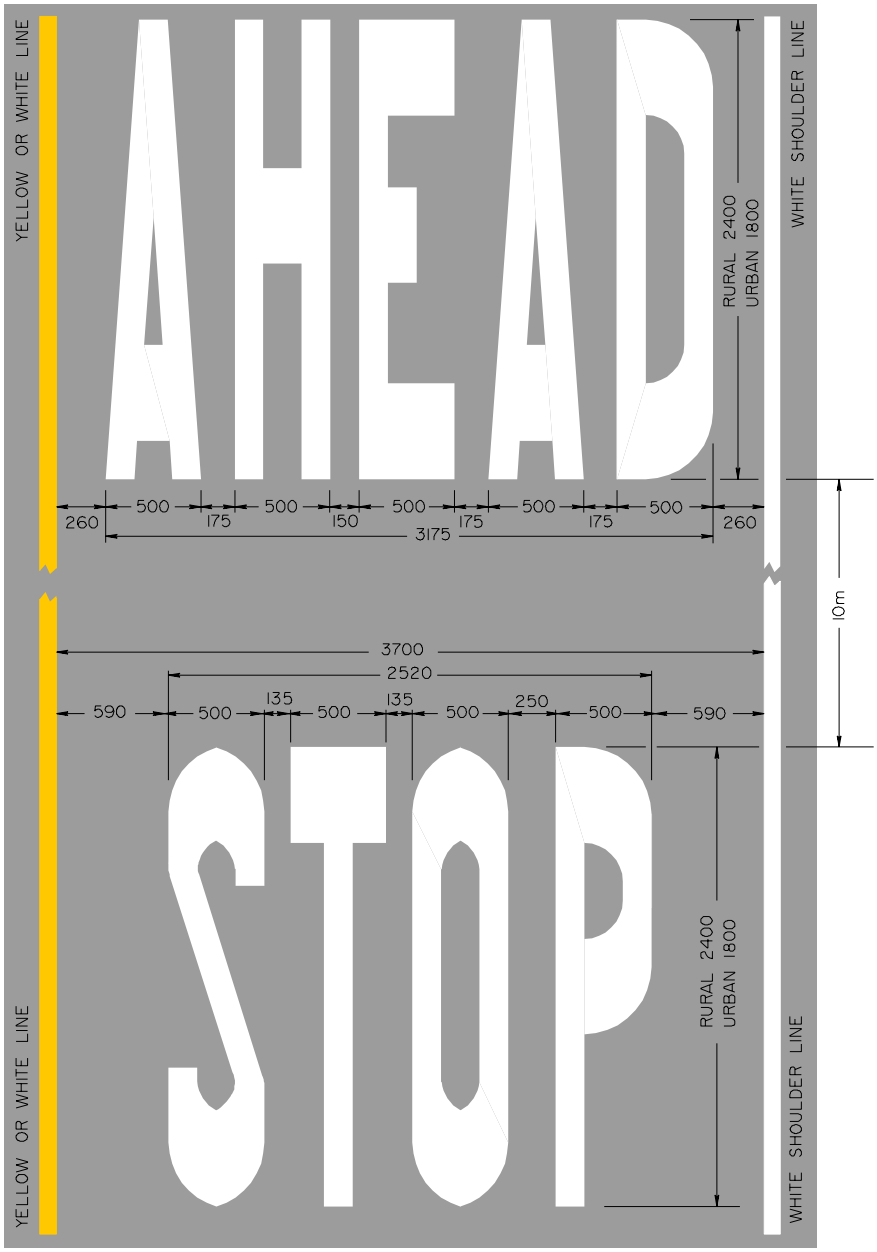
Alberta TRANSPORTATION

FIGURE
TCS-C-420

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
MARKING MESSAGES
SCHOOL

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C4



NOTES:

MESSAGES TO BE PAINTED WHITE.
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.
AREA OF WORD "STOP AHEAD" IS 6.9m^2 (RURAL) AND 3.8m^2 (URBAN).

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.13	B.B.	Mar/03

Alberta TRANSPORTATION

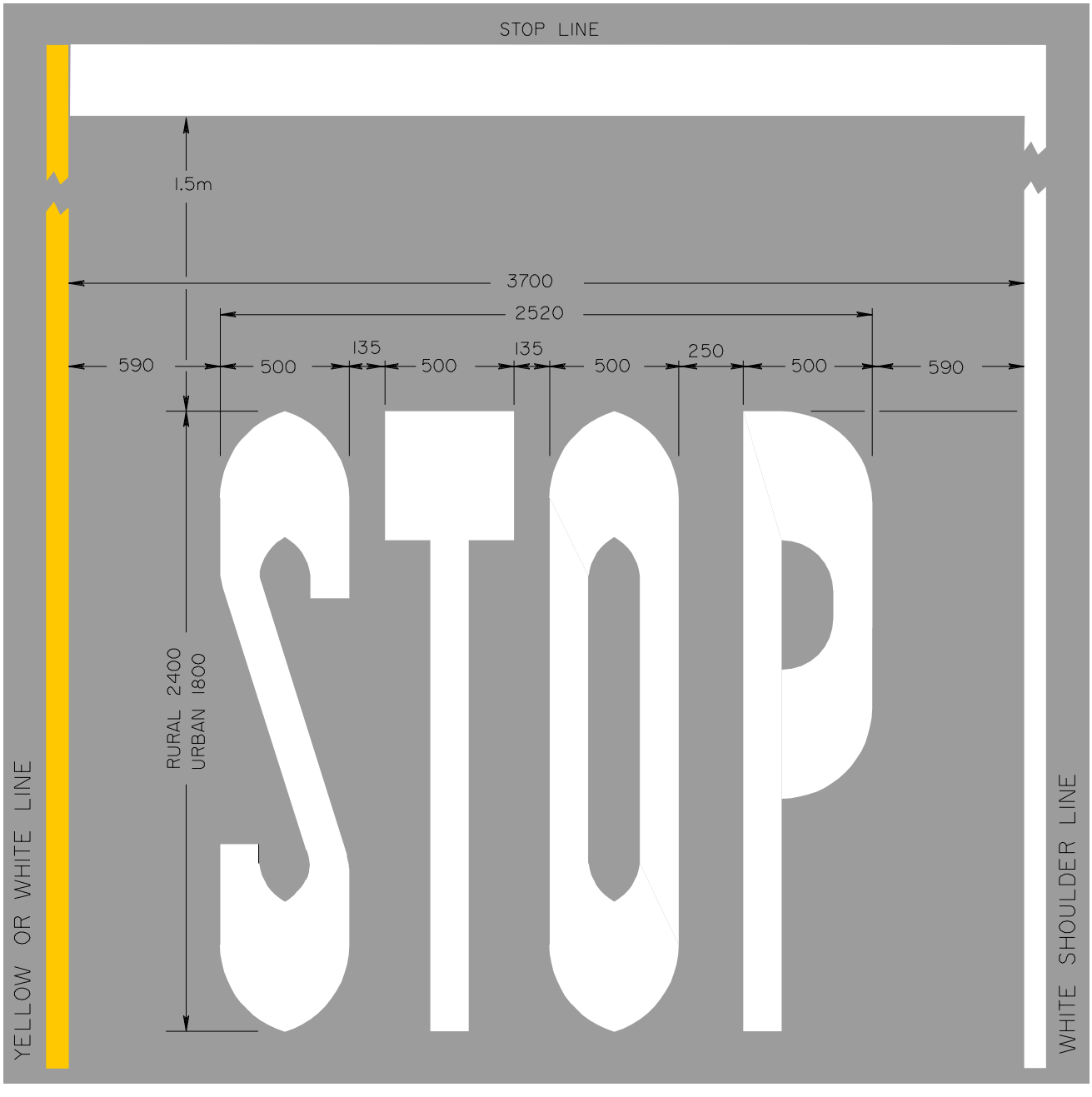
FIGURE
TCS-C-425

Date: JANUARY 1995

TYPICAL PAVEMENT MARKING MESSAGES

"STOP AHEAD"

Prepared By: T.N.	Checked By: R.D.	Scale: N.T.S.	Section C4



NOTE:

THE WORD "STOP" SHALL NOT BE USED ON THE PAVEMENT UNLESS ACCOMPANIED BY A STOP LINE.

THE WORD "STOP" SHALL NOT BE USED ON PAVEMENT IN ADVANCE OF A STOP LINE, UNLESS EVERY VEHICLE IS REQUIRED TO STOP AT ALL TIMES.

MESSAGE TO BE PAINTED WHITE.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

AREA OF WORD "STOP" IS = 2.89m² (RURAL) AND 1.57m² (URBAN).

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-4.14	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE TCS-C-430

Date: JANUARY 1995

TYPICAL PAVEMENT MARKING MESSAGES

"STOP"

Prepared By: T.N.	Checked By: R.D.	Scale: N.T.S.	Section C4

C5. Intersection Markings

C5.1 General

Intersection markings for the various types of intersections shall follow the general pattern described in each of the drawings.

In general, a no-passing zone for traffic travelling along a major roadway shall extend not less than 225 m in advance of the intersection for each direction of travel. A no-passing zone beyond the intersection is marked for the length of the tapers to prevent conflicts with merging traffic.

Lane lines shall be solid where lane changing would normally be an unsafe manoeuvre.

A no-passing zone for traffic approaching a STOP condition shall extend not less than 300 m from a painted stop line. A no-passing zone for traffic leaving an intersection along the intersecting roadway shall extend not less than 60 m from the stop line.

Stop lines should preferably be placed between 1.2 m and 3.0 m from the edge and parallel to the intersecting roadway. The exact location of a stop line should be established in the field based on site-specific conditions. These conditions may include the intersection geometry, the path of vehicles turning left from the main highway onto the intersecting roadway, presence of obstructions along a sight line and other operational conditions.

White chevron lines may be used in special situations such as gore areas and pork chop islands.

C5.2 Rural Intersections

Figures TCS-C-501 to TCS-C-501.14 show the typical pavement markings for Type I to Type Vc intersections. The geometric design details for these intersections are found in the Highway Geometric Design Guide.

Lane movement markings and continuity lines are dependent on warrant analysis completed at the design stage for each intersection. Arrows are typically only placed in exclusive left or right turn lanes, or in shared through/left or through/right lanes. Straight through arrows may be used at the discretion of the design engineer in cases where it is thought there may be confusion regarding lane designation.

C5.3 Log Haul Intersections

Log haul intersections are typically different because of their geometric configuration and the time that the logging trucks take to accelerate up to running speed as well as the additional right-of-way required for the log sweep. Figures TCS-C-505 to TCS-C-505.5 show pavement markings for log haul intersections Types 1 to 6. The geometric design details for these intersections are found in the Highway Geometric Design Guide. The use of arrows in log haul intersections is due to the size of the vehicles and complex geometry.

C5.4 Intersections with Four-Lane Divided Highways

Figures TCS-C-510 to TCS-C-510.4 show the pavement markings required for intersections on four-lane divided highways. The geometric design details for these intersections are in the Highway Geometric Design Guide.

It is desirable to paint around the noses of all medians on divided highways, unless the volume on the intersecting road is less than 100 vehicles per day. In this case, a gap in the edge line may be left.

C5.5 Urban Intersections

Figures TCS-C-515 and TCS-C-515.1 show the typical pavement markings for urban intersections. The dimensions on channelized intersections vary with each situation, therefore, a plan must be available for each intersection prior to marking.
The treatment for particular lane movements in urban intersections will depend on traffic volumes, posted speed and type of control (signalized versus unsignalized).

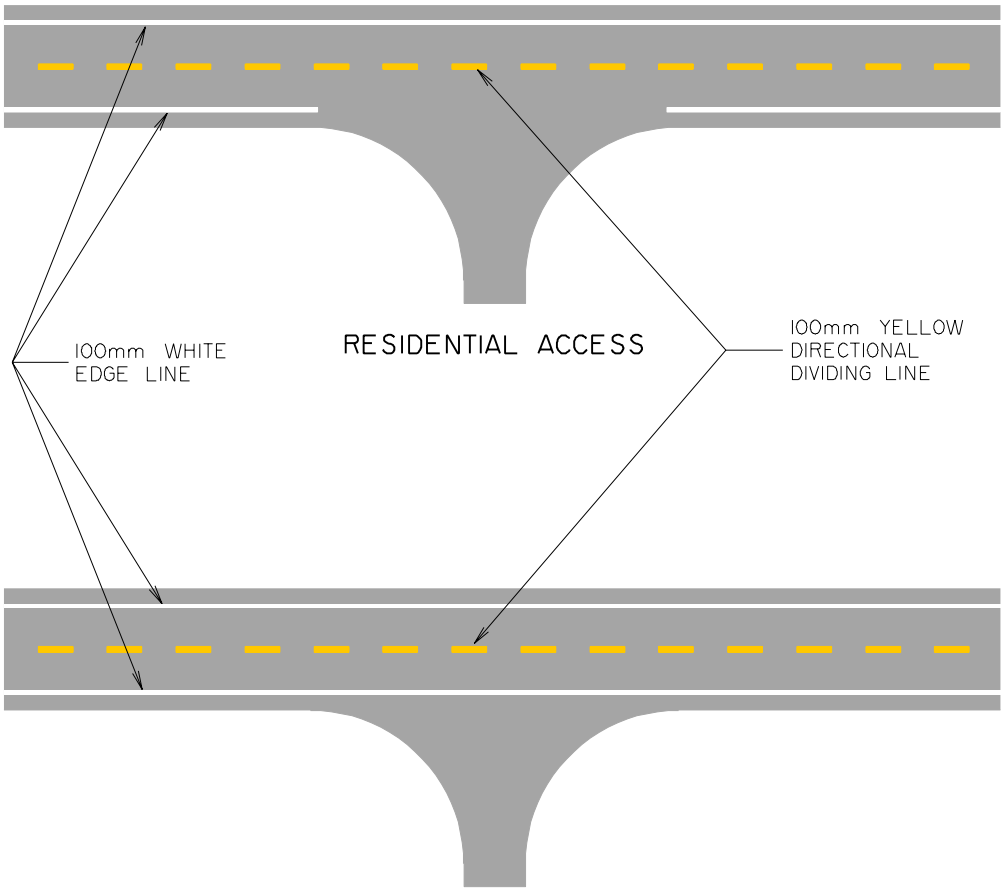
A left turn lane at an intersection is delineated by a solid line (along a parallel portion), then a continuity line. A right turn lane is delineated from the travel lane by a continuity line. Solid line may be used if a right turn lane has a parallel section.

Lane designation arrows should only normally be considered along exclusive left or right turn lanes and combination through/turn lanes at complex intersections along roadways, which are posted at 80 km/h or more.

The arrows may also be considered at locations where the geometry of an intersection and lane allocation may be confusing to drivers

Typically, a single lane designation arrow is placed 30 m from the centerline of the intersection. For longer turning lanes with parallel portions exceeding 50 m, a second arrow is placed 100 m from the first arrow for the posted speed 100 km/h or greater and 45 m for posted speed less than 100 km/h.

Guiding lines may be used at complex intersections (such as the intersections with dual left turn lanes) to provide guidance to drivers as they proceed through an intersection or merge into proper travel lanes.



FIELD ACCESS

NOTES:

1. BREAKS IN EDGE LINES APPROXIMATELY 20m IN LENGTH SHALL BE MADE AT APPROACHES TO FARMS SITES WITH DWELLINGS, BUSINESS ESTABLISHMENTS AND OTHER RESIDENTIAL AREAS.

2. EDGE LINES SHALL CONTINUE THROUGH FIELD ACCESSES.

No.	DESCRIPTION	BY	DATE
2			
1			

Alberta TRANSPORTATION

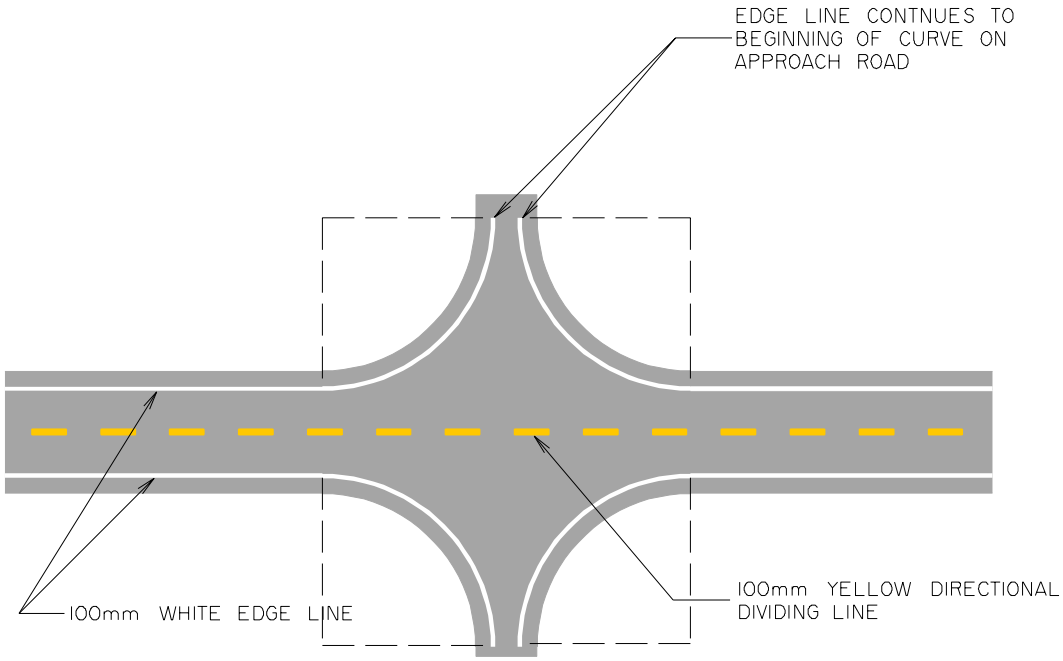
FIGURE TCS-C-501

Date: MARCH 2003

TYPICAL PAVEMENT MARKINGS

RESIDENTIAL AND FIELD ACCESS

Prepared By: S.L.	Checked By: B.B	Scale: N.T.S.	Section C5



HGIHWAY DESIGNATION	LANE/SHOULDER WIDTH (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7 / 3.0	1.5
RAU-211.8	3.7 / 2.2	1.5
RAU-210	3.5 / 1.5	1.5
RAU-209	3.5 / 1.0	1.0
RAU-208	3.5 / 0.5	0.5

No.	DESCRIPTION	BY	DATE
2			
1			

Alberta TRANSPORTATION

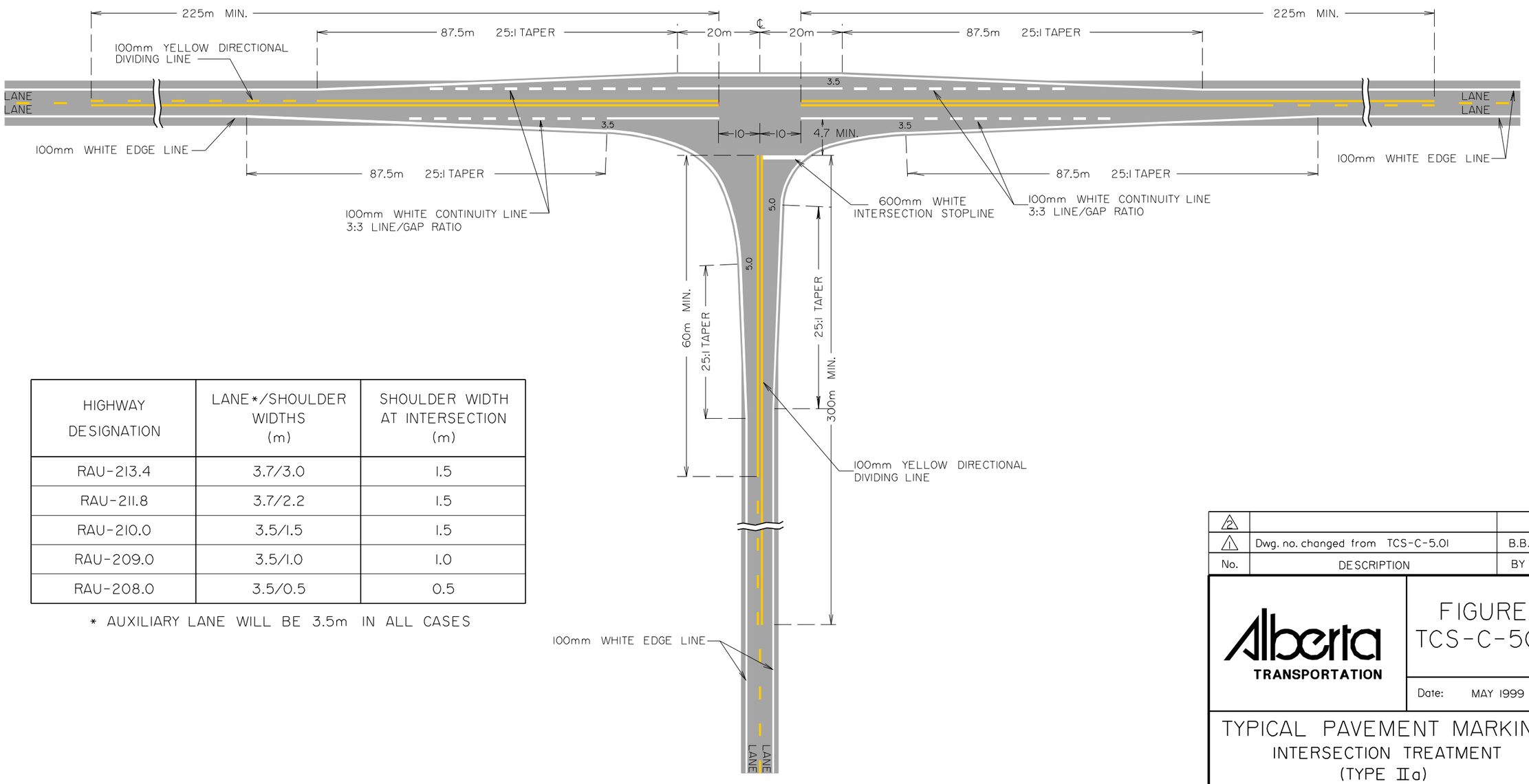
FIGURE TCS-C-501.1

Date: MARCH 2003

TYPICAL PAVEMENT MARKINGS

HIGHWAY/LOCAL ROAD TYPE I INTERSECTION

Prepared By: S.L.	Checked By: B.B	Scale: N.T.S.	Section C5



HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.01	B.B.	Mar/03

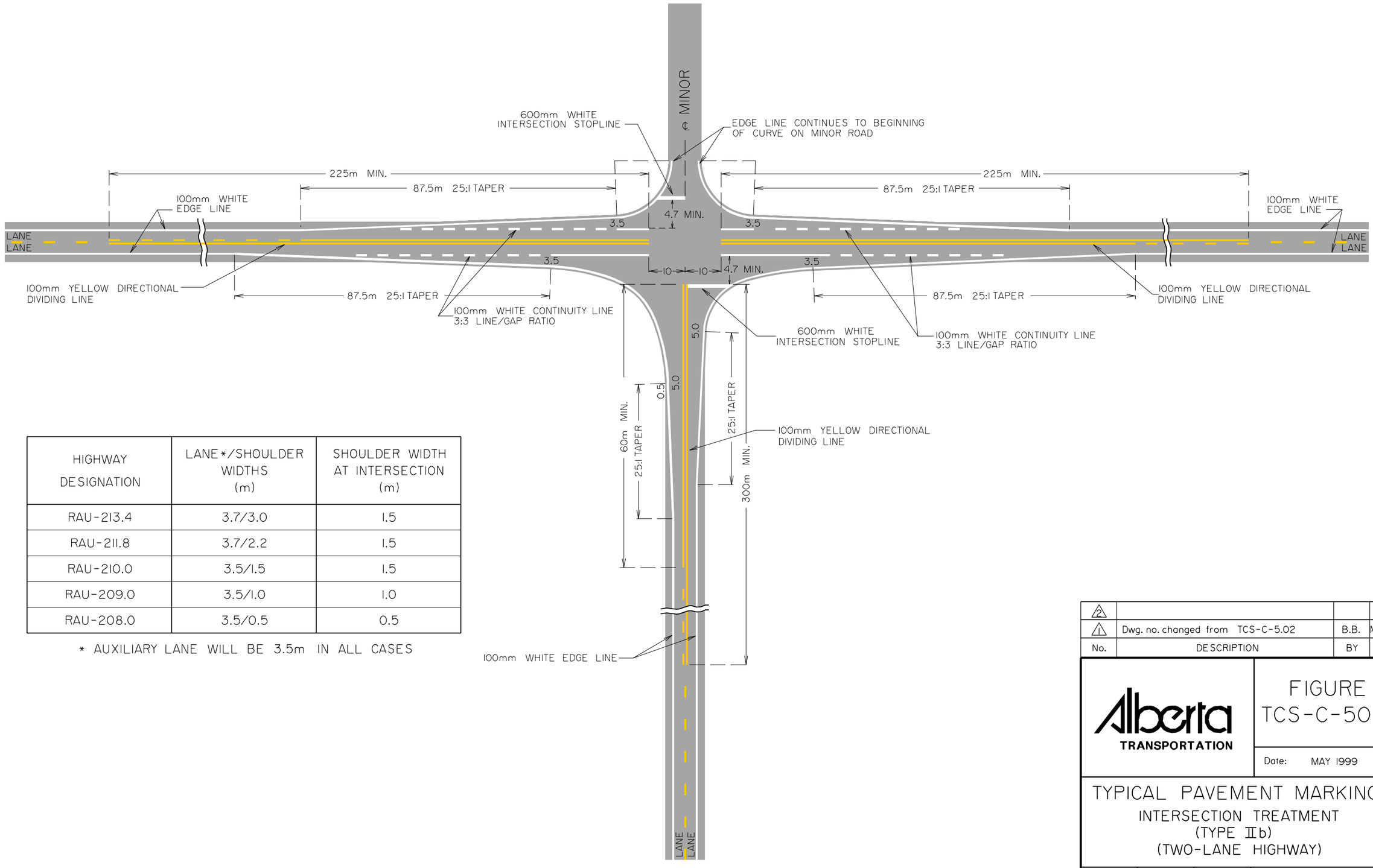
Alberta TRANSPORTATION

FIGURE TCS-C-501.2

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT (TYPE IIa) (TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.02	B.B.	Mar/03

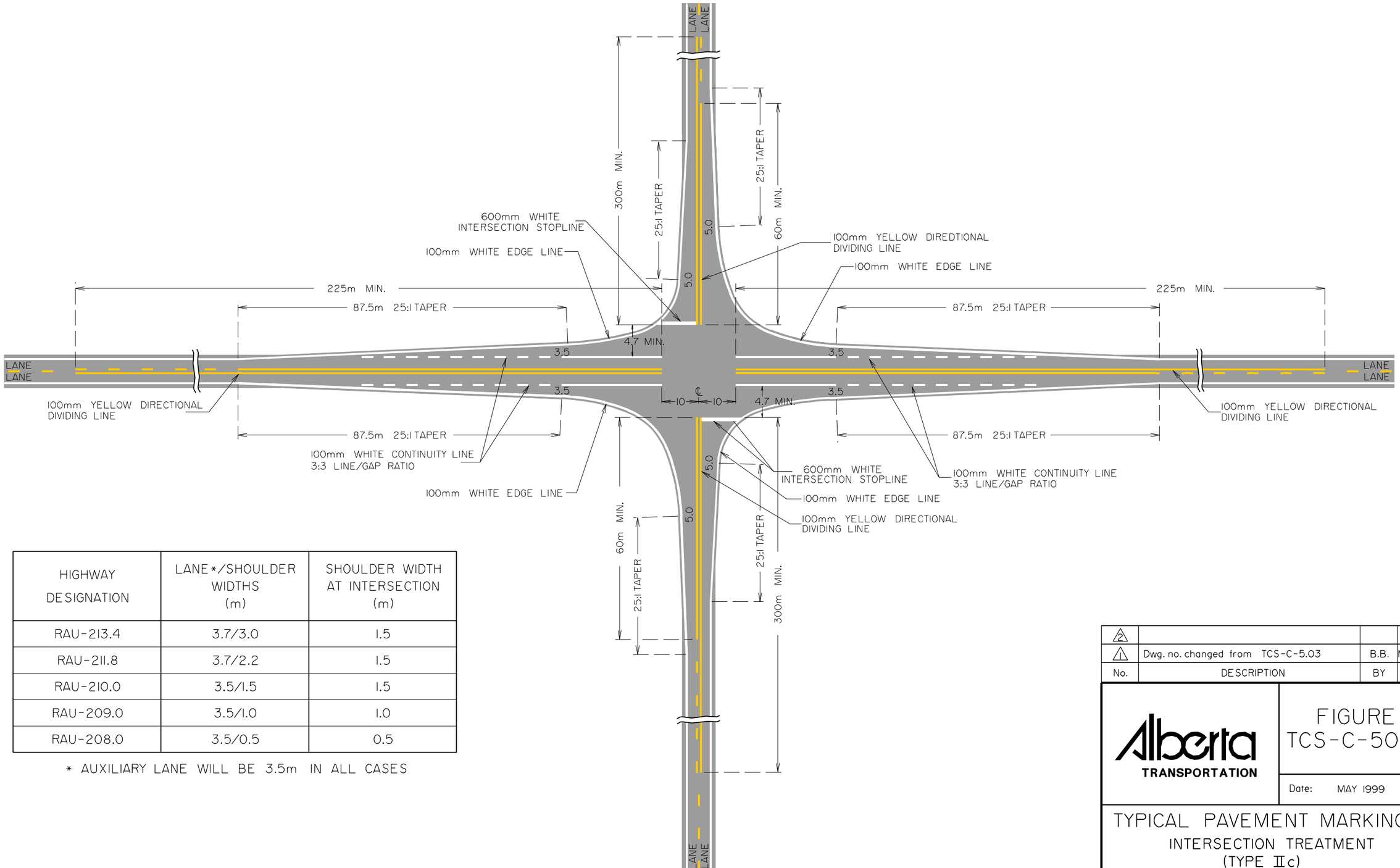
Alberta TRANSPORTATION

FIGURE
TCS-C-501.3

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT (TYPE IIb) (TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.03	B.B.	Mar/03

Alberta TRANSPORTATION

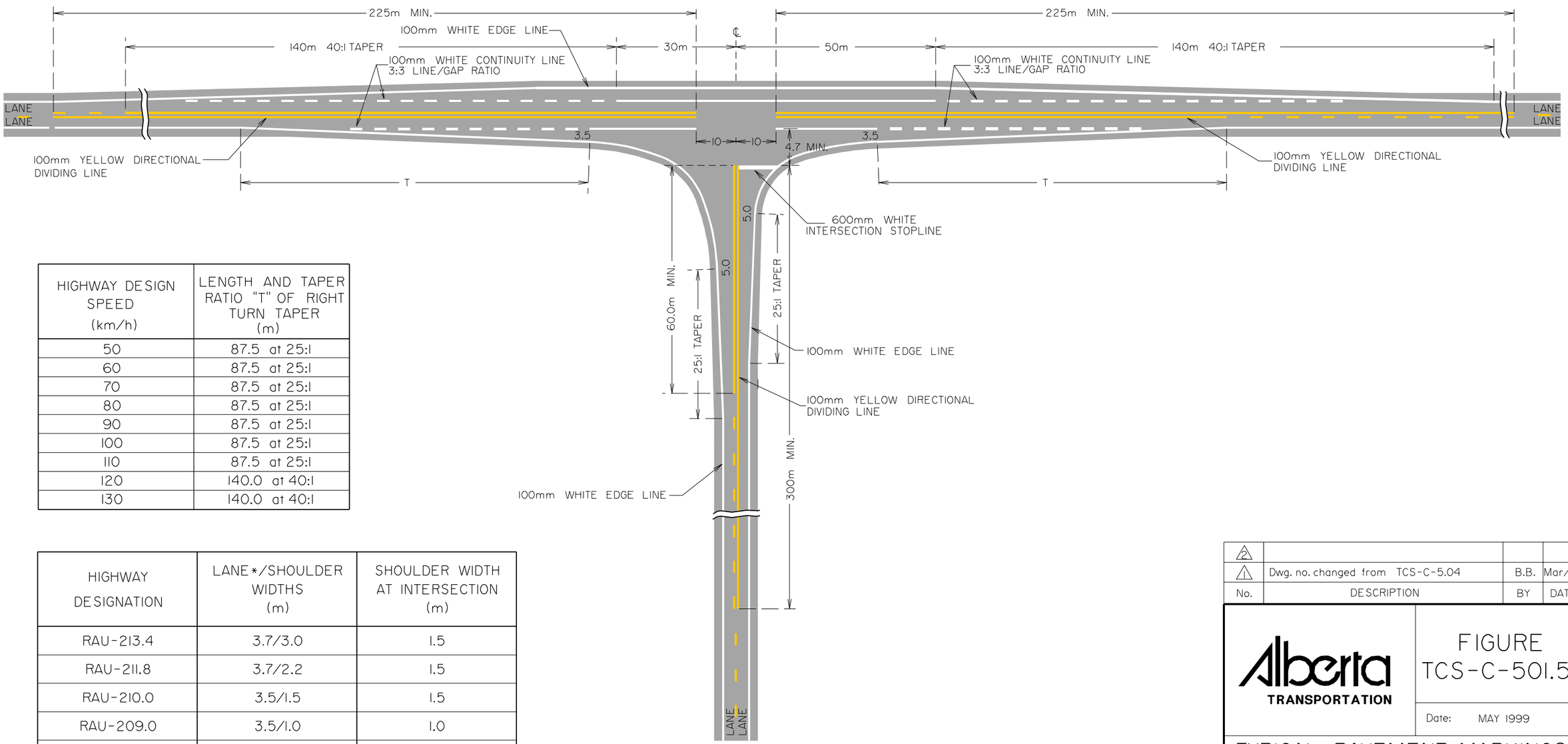
FIGURE
TCS-C-501.4

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

INTERSECTION TREATMENT (TYPE IIc) (TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



HIGHWAY DESIGN SPEED (km/h)	LENGTH AND TAPER RATIO "T" OF RIGHT TURN TAPER (m)
50	87.5 at 25:1
60	87.5 at 25:1
70	87.5 at 25:1
80	87.5 at 25:1
90	87.5 at 25:1
100	87.5 at 25:1
110	87.5 at 25:1
120	140.0 at 40:1
130	140.0 at 40:1

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.04	B.B.	Mar/03

Alberta TRANSPORTATION

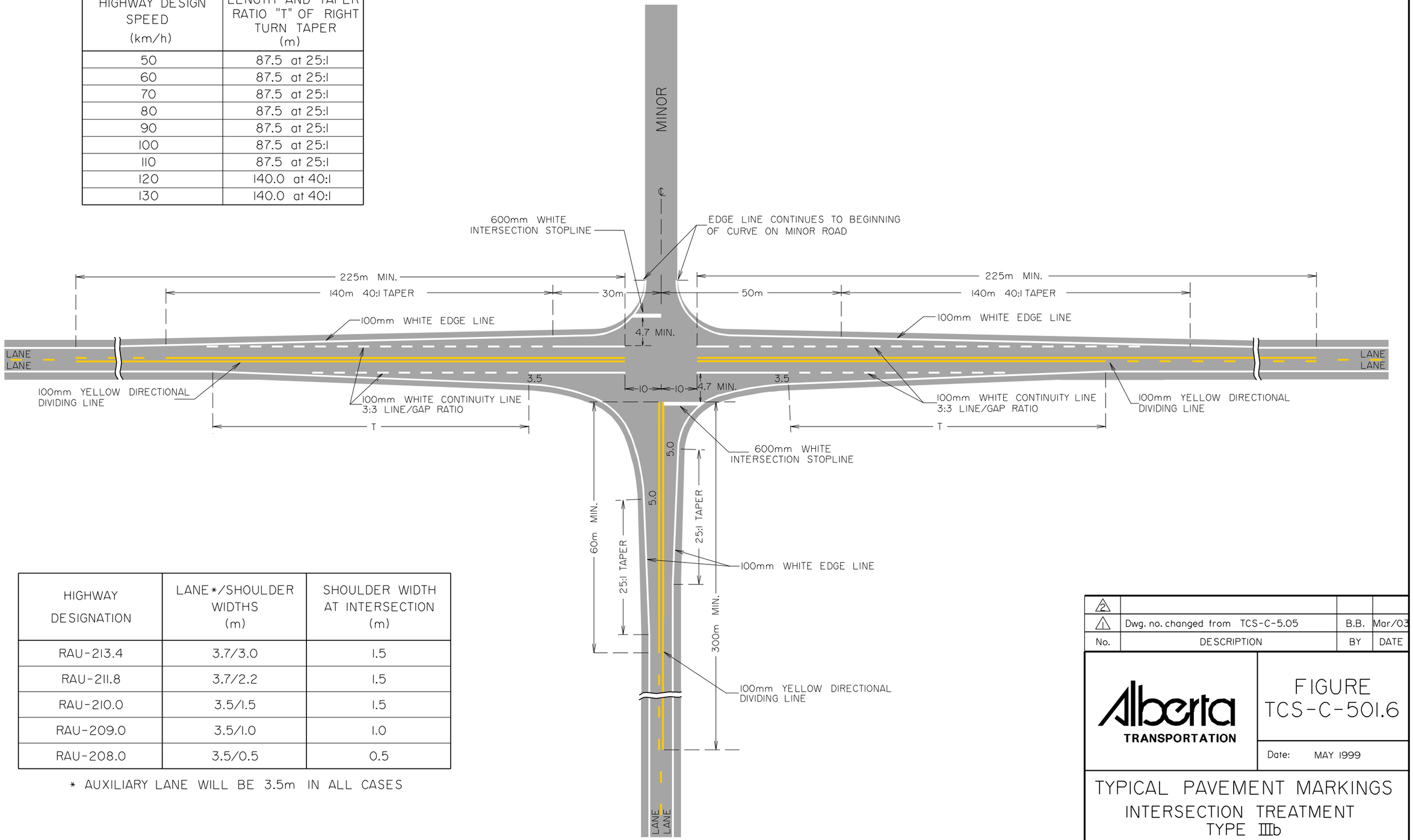
FIGURE
TCS-C-501.5

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT (TYPE IIIa) (TWO- LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5

HIGHWAY DESIGN SPEED (km/h)	LENGTH AND TAPER RATIO "T" OF RIGHT TURN TAPER (m)
50	87.5 at 25:1
60	87.5 at 25:1
70	87.5 at 25:1
80	87.5 at 25:1
90	87.5 at 25:1
100	87.5 at 25:1
110	87.5 at 25:1
120	140.0 at 40:1
130	140.0 at 40:1



HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.05	B.B.	Mar/03

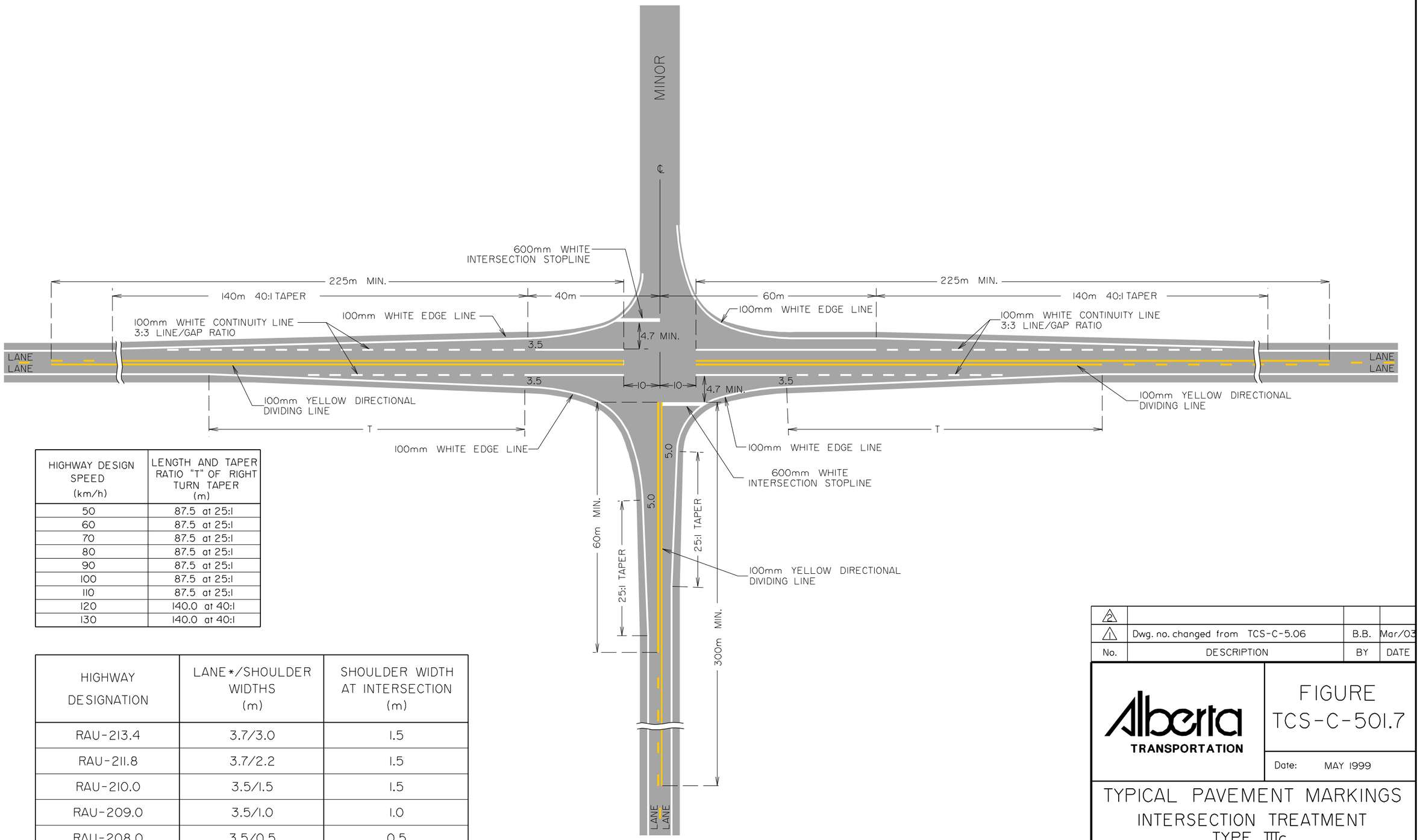
Alberta TRANSPORTATION

FIGURE TCS-C-501.6

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT TYPE IIIb (TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



HIGHWAY DESIGN SPEED (km/h)	LENGTH AND TAPER RATIO "T" OF RIGHT TURN TAPER (m)
50	87.5 at 25:1
60	87.5 at 25:1
70	87.5 at 25:1
80	87.5 at 25:1
90	87.5 at 25:1
100	87.5 at 25:1
110	87.5 at 25:1
120	140.0 at 40:1
130	140.0 at 40:1

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.06	B.B.	Mar/03

Alberta TRANSPORTATION

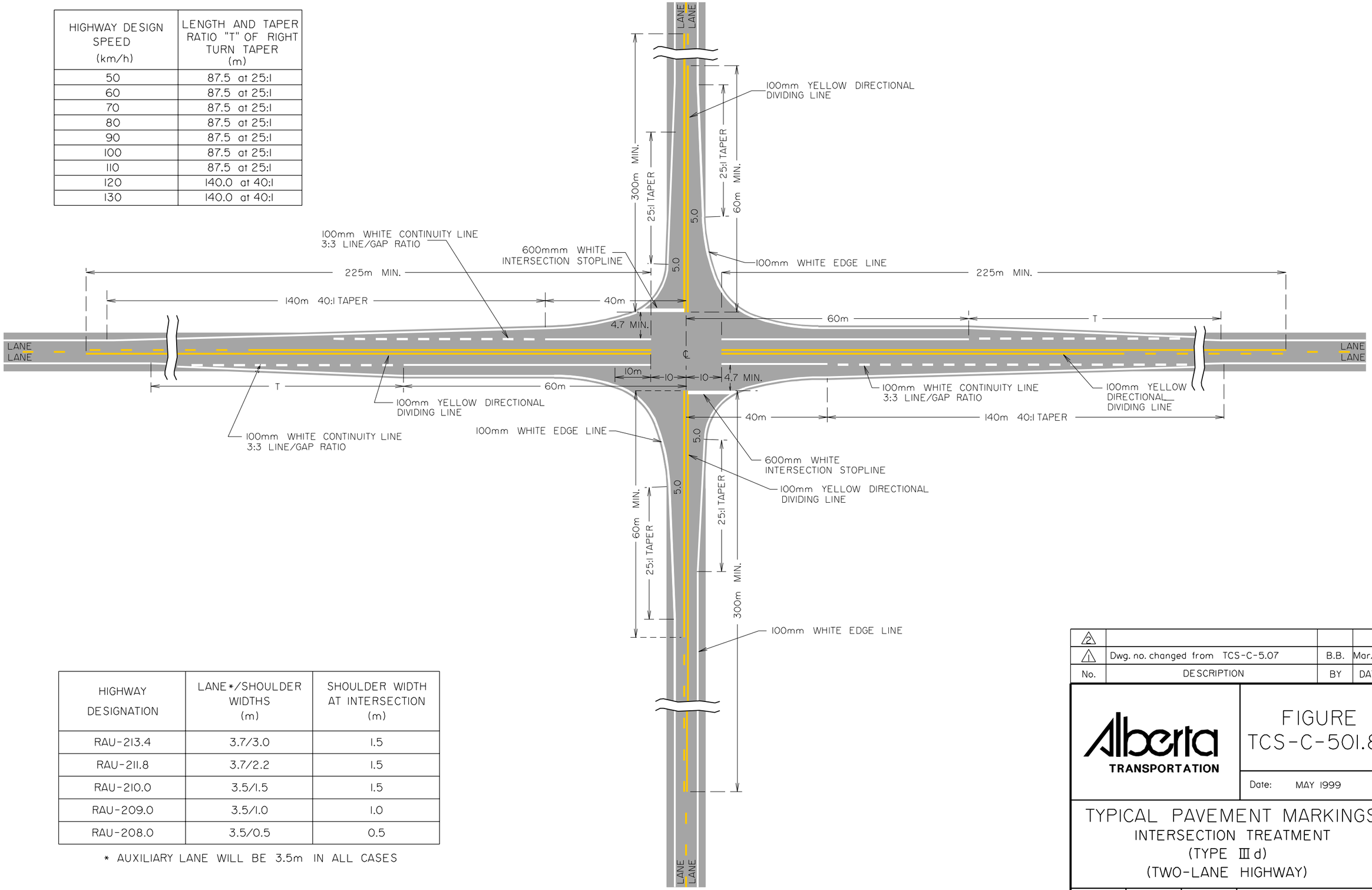
FIGURE
TCS-C-501.7

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT TYPE IIIc (TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M	Scale: N.T.S.	Section C5

HIGHWAY DESIGN SPEED (km/h)	LENGTH AND TAPER RATIO "T" OF RIGHT TURN TAPER (m)
50	87.5 at 25:1
60	87.5 at 25:1
70	87.5 at 25:1
80	87.5 at 25:1
90	87.5 at 25:1
100	87.5 at 25:1
110	87.5 at 25:1
120	140.0 at 40:1
130	140.0 at 40:1



HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.07	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE
TCS-C-501.8

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT
(TYPE III d)
(TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5

TABLE 1: LEFT TURN LANE

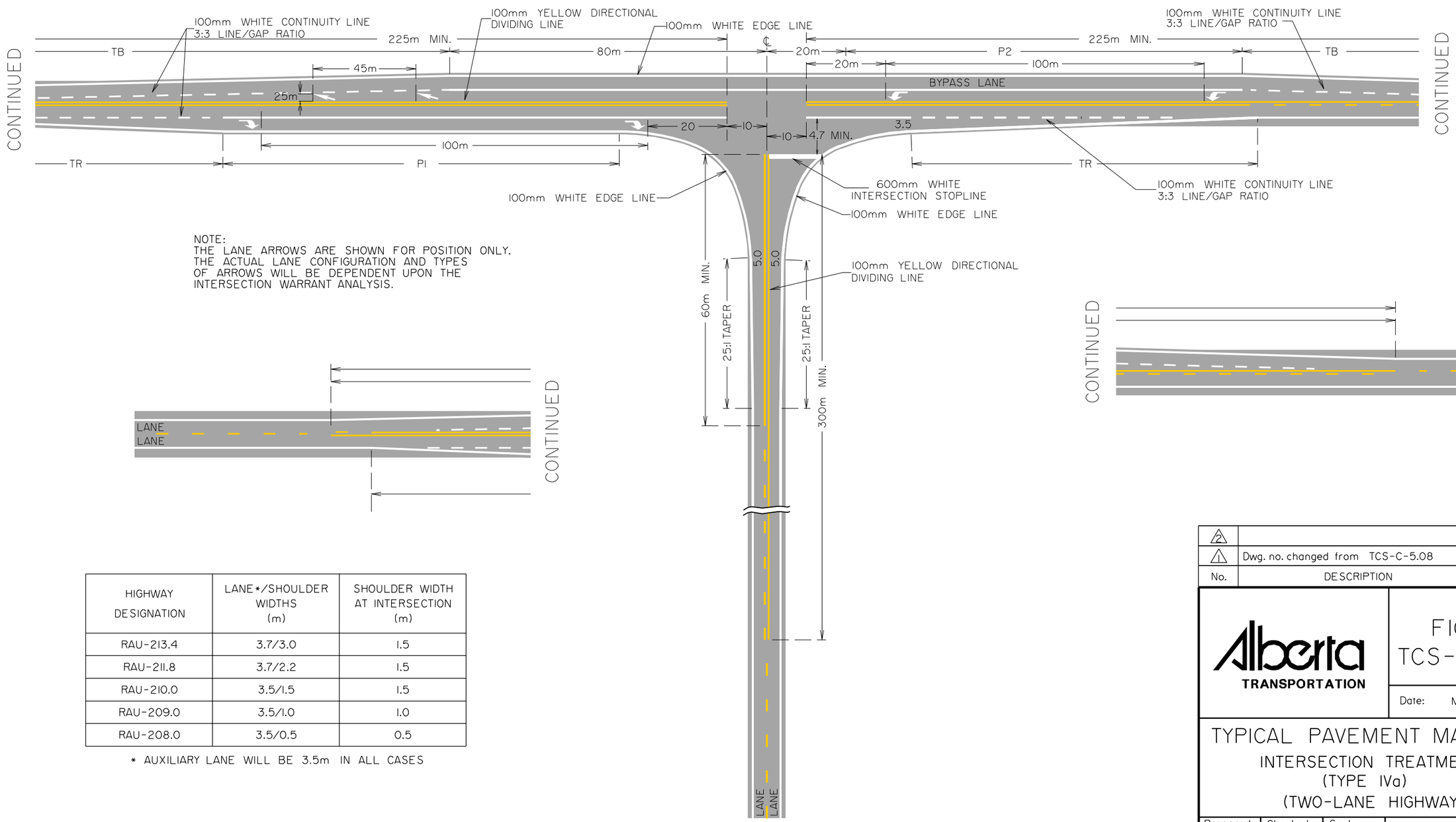
HIGHWAY DESIGN SPEED km/h	LENGTH AND TAPER RATIO "TB" OF BYPASS LANE (m)	PARALLEL DECELERATION LANE "P2" ** (m)	LENGTH AVAILABLE FOR DECELERATION ½ TAPER+LANE	DECELERATION LENGTH REQUIRED BASED ON DESIGN SPEED	STORAGE LENGTH PROVIDED BY STANDARD TREATMENT
50	140 at 40:1	20	90	70	20
60	140 at 40:1	35	105	90	15
70	140 at 40:1	55	125	110	15
80	140 at 40:1	80	150	130	20
90	210 at 60:1	70	175	150	25
100	210 at 60:1	85	190	170	20
110	210 at 60:1	100	205	190	15
120	210 at 60:1	120	225	210	15
130	210 at 60:1	125	230	215	15

** ADJUST PARALLEL LANE LENGTH FOR GRADE EFFECT.

TABLE 2: RIGHT TURN LANE

HIGHWAY DESIGN SPEED (km/h)	LENGTH AND TAPER RATIO "TR" OF RIGHT TURN TAPER (m)	LENGTH OF PARALLEL LANE "PI" ** (m)		LENGTH AVAILABLE FOR DECELERATION: LANE + TAPER	DECELERATION LENGTH REQUIRED BASED ON DESIGN SPEED	STORAGE LENGTH PROVIDED BY STANDARD TREATMENT
		RIGHT TURN LANE NOT WARRANTED	RIGHT TURN LANE WARRANTED			
50	87.5 at 25:1	0	0	87.5	70	17.5
60	87.5 at 25:1	0	10	97.5	90	7.5
70	87.5 at 25:1	0	35	122.5	110	12.5
80	87.5 at 25:1	10	50	137.5	130	7.5
90	87.5 at 25:1	10	65	152.5	150	2.5
100	87.5 at 25:1	10	85	172.5	170	2.5
110	140.0 at 40:1	20	100	240	190	50
120	140.0 at 40:1	20	100	240	210	30
130	140.0 at 40:1	30	110	250	215	35

** ADJUST PARALLEL LANE LENGTH FOR GRADE EFFECT.



NOTE:
THE LANE ARROWS ARE SHOWN FOR POSITION ONLY.
THE ACTUAL LANE CONFIGURATION AND TYPES
OF ARROWS WILL BE DEPENDENT UPON THE
INTERSECTION WARRANT ANALYSIS.

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.08	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE
TCS-C-501.9

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT
(TYPE IVa)
(TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5

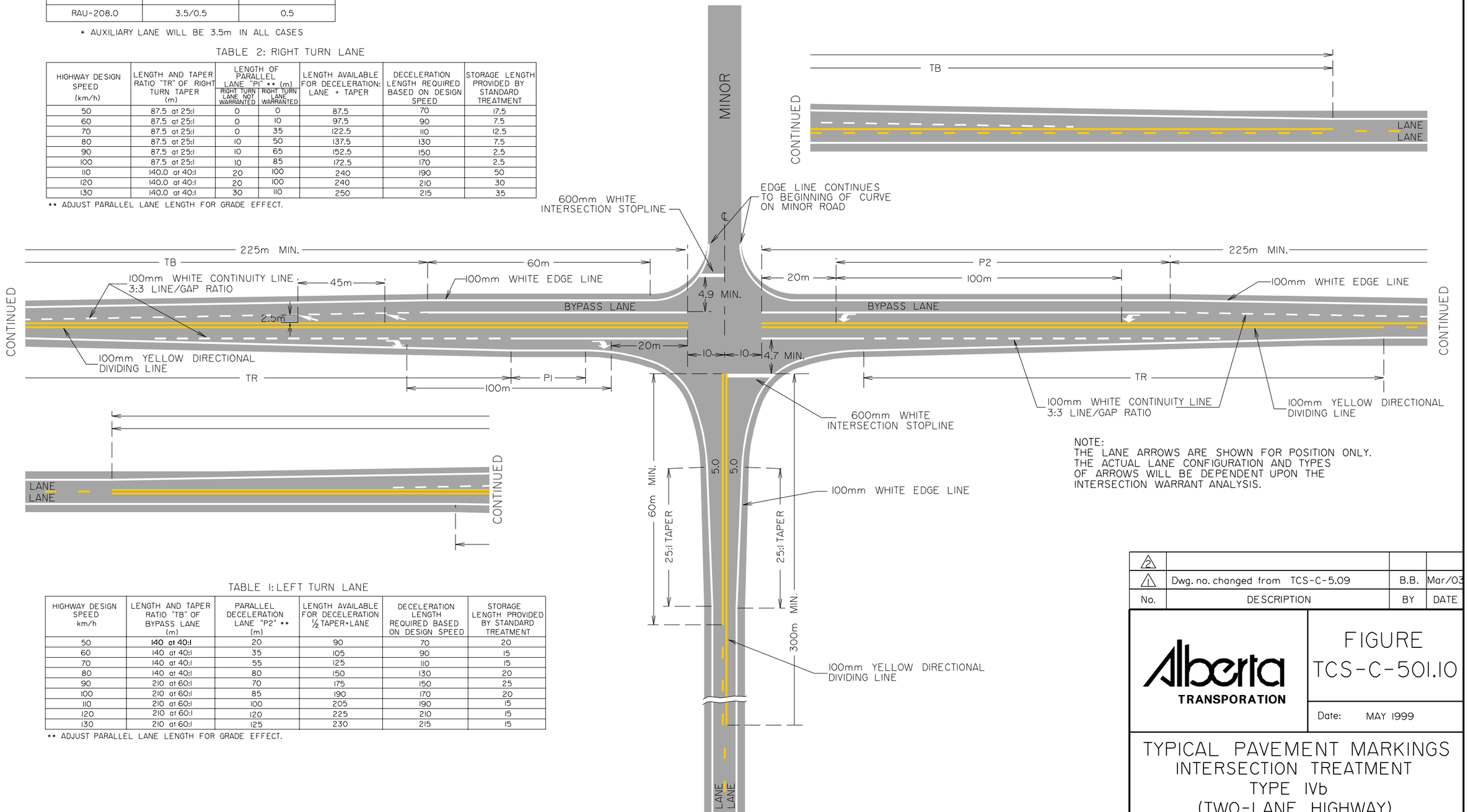
HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

TABLE 2: RIGHT TURN LANE

HIGHWAY DESIGN SPEED (km/h)	LENGTH AND TAPER RATIO "TR" OF RIGHT TURN TAPER (m)	LENGTH OF PARALLEL LANE "PI" ** (m)		LENGTH AVAILABLE FOR DECELERATION: LANE + TAPER	DECELERATION LENGTH REQUIRED BASED ON DESIGN SPEED	STORAGE LENGTH PROVIDED BY STANDARD TREATMENT
		RIGHT TURN LANE NOT WARRANTED	RIGHT TURN LANE WARRANTED			
50	87.5 at 25:1	0	0	87.5	70	17.5
60	87.5 at 25:1	0	10	97.5	90	7.5
70	87.5 at 25:1	0	35	122.5	110	12.5
80	87.5 at 25:1	10	50	137.5	130	7.5
90	87.5 at 25:1	10	65	152.5	150	2.5
100	87.5 at 25:1	10	85	172.5	170	2.5
110	140.0 at 40:1	20	100	240	190	50
120	140.0 at 40:1	20	100	240	210	30
130	140.0 at 40:1	30	110	250	215	35

** ADJUST PARALLEL LANE LENGTH FOR GRADE EFFECT.



NOTE:
THE LANE ARROWS ARE SHOWN FOR POSITION ONLY.
THE ACTUAL LANE CONFIGURATION AND TYPES OF ARROWS WILL BE DEPENDENT UPON THE INTERSECTION WARRANT ANALYSIS.

TABLE 1: LEFT TURN LANE

HIGHWAY DESIGN SPEED km/h	LENGTH AND TAPER RATIO "TB" OF BYPASS LANE (m)	PARALLEL DECELERATION LANE "P2" ** (m)	LENGTH AVAILABLE FOR DECELERATION ½ TAPER+LANE	DECELERATION LENGTH REQUIRED BASED ON DESIGN SPEED	STORAGE LENGTH PROVIDED BY STANDARD TREATMENT
50	140 at 40:1	20	90	70	20
60	140 at 40:1	35	105	90	15
70	140 at 40:1	55	125	110	15
80	140 at 40:1	80	150	130	20
90	210 at 60:1	70	175	150	25
100	210 at 60:1	85	190	170	20
110	210 at 60:1	100	205	190	15
120	210 at 60:1	120	225	210	15
130	210 at 60:1	125	230	215	15

** ADJUST PARALLEL LANE LENGTH FOR GRADE EFFECT.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.09	B.B.	Mar/03

Alberta TRANSPORATION

FIGURE
TCS-C-501.10

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS INTERSECTION TREATMENT TYPE IVb (TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5

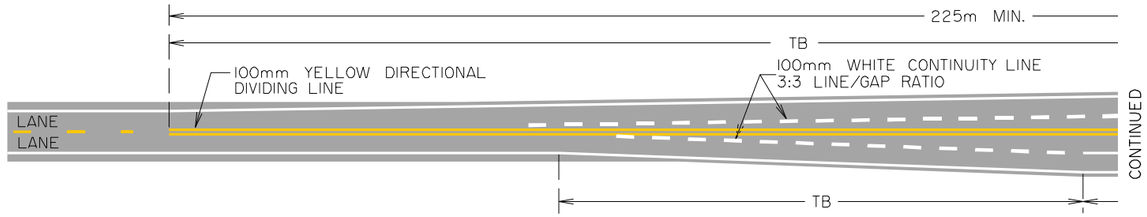


TABLE 2: LEFT TURN LANE

HIGHWAY DESIGN SPEED km/h	LENGTH AND TAPER RATIO "TB" OF BYPASS LANE (m)	PARALLEL DECELERATION LANE "P2" ** (m)	LENGTH AVAILABLE FOR DECELERATION ½ TAPER+LANE	DECELERATION LENGTH REQUIRED BASED ON DESIGN SPEED	STORAGE LENGTH PROVIDED BY STANDARD TREATMENT
50	140 at 40:1	20	90	70	20
60	140 at 40:1	35	105	90	15
70	140 at 40:1	55	125	110	15
80	140 at 40:1	80	150	130	20
90	210 at 60:1	70	175	150	25
100	210 at 60:1	85	190	170	20
110	210 at 60:1	100	205	190	15
120	210 at 60:1	120	225	210	15
130	210 at 60:1	125	230	215	15

** ADJUST PARALLEL LANE LENGTH FOR GRADE EFFECT.

NOTE:
THE LANE ARROWS ARE SHOWN FOR POSITION ONLY.
THE ACTUAL LANE CONFIGURATION AND TYPES OF ARROWS WILL BE DEPENDENT UPON THE INTERSECTION WARRANT ANALYSIS.

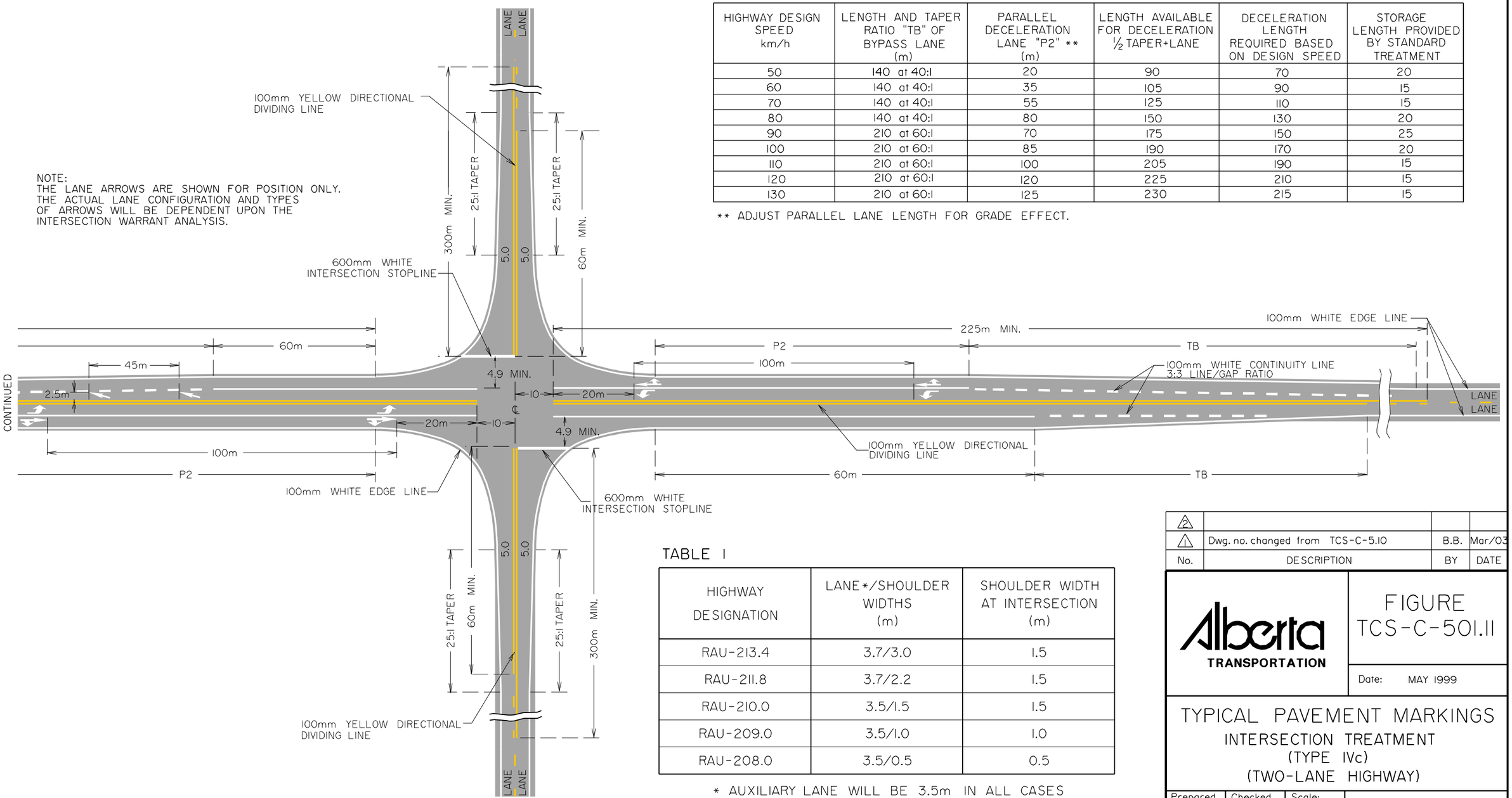


TABLE 1

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.10	B.B.	Mar/03

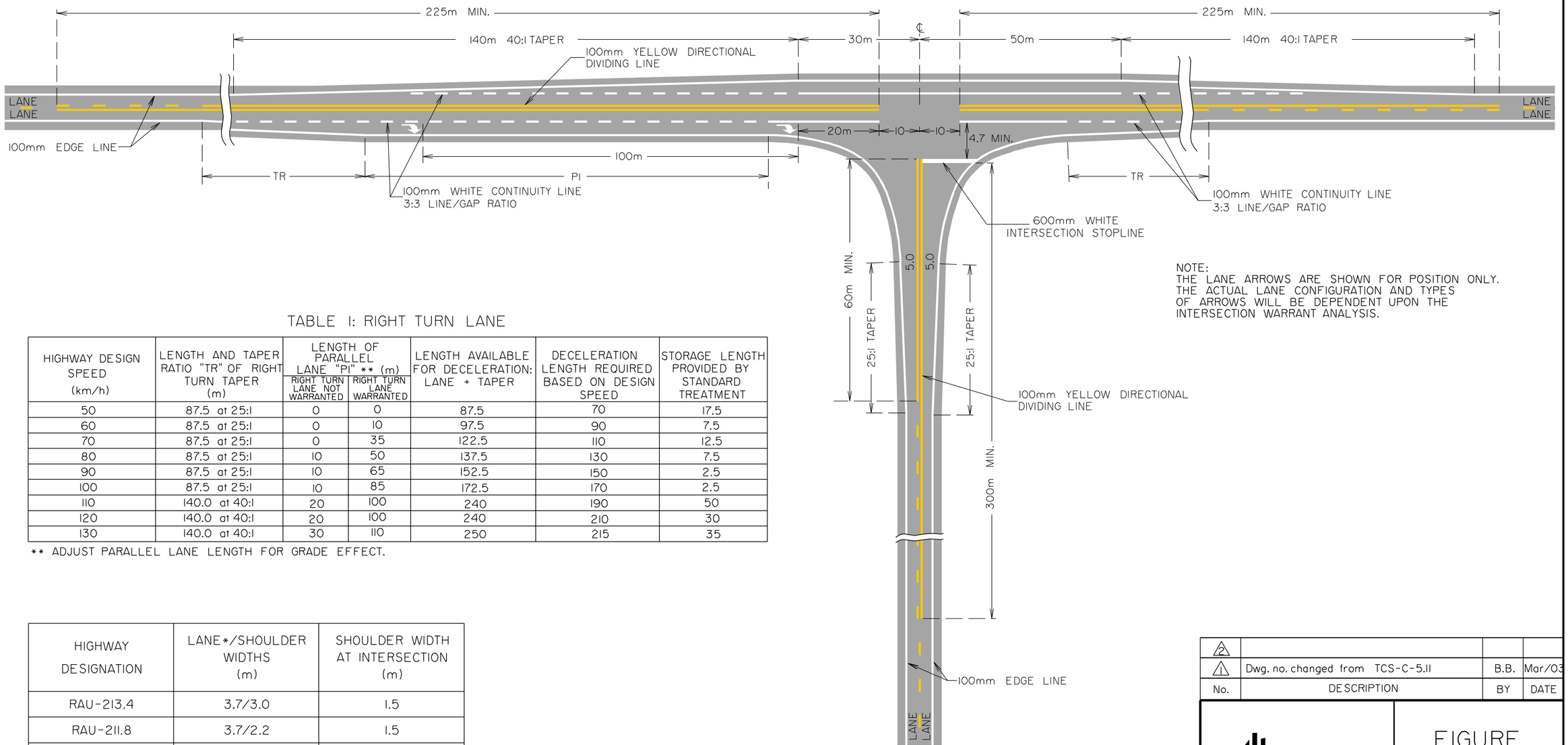
Alberta TRANSPORTATION

FIGURE
TCS-C-501.11

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT (TYPE IVc) (TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



NOTE:
THE LANE ARROWS ARE SHOWN FOR POSITION ONLY. THE ACTUAL LANE CONFIGURATION AND TYPES OF ARROWS WILL BE DEPENDENT UPON THE INTERSECTION WARRANT ANALYSIS.

TABLE I: RIGHT TURN LANE

HIGHWAY DESIGN SPEED (km/h)	LENGTH AND TAPER RATIO "TR" OF RIGHT TURN TAPER (m)	LENGTH OF PARALLEL LANE "PI" ** (m)		LENGTH AVAILABLE FOR DECELERATION: LANE + TAPER	DECELERATION LENGTH REQUIRED BASED ON DESIGN SPEED	STORAGE LENGTH PROVIDED BY STANDARD TREATMENT
		RIGHT TURN LANE NOT WARRANTED	RIGHT TURN LANE WARRANTED			
50	87.5 at 25:1	0	0	87.5	70	17.5
60	87.5 at 25:1	0	10	97.5	90	7.5
70	87.5 at 25:1	0	35	122.5	110	12.5
80	87.5 at 25:1	10	50	137.5	130	7.5
90	87.5 at 25:1	10	65	152.5	150	2.5
100	87.5 at 25:1	10	85	172.5	170	2.5
110	140.0 at 40:1	20	100	240	190	50
120	140.0 at 40:1	20	100	240	210	30
130	140.0 at 40:1	30	110	250	215	35

** ADJUST PARALLEL LANE LENGTH FOR GRADE EFFECT.

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.11	B.B.	Mar/03

Alberta TRANSPORTATION

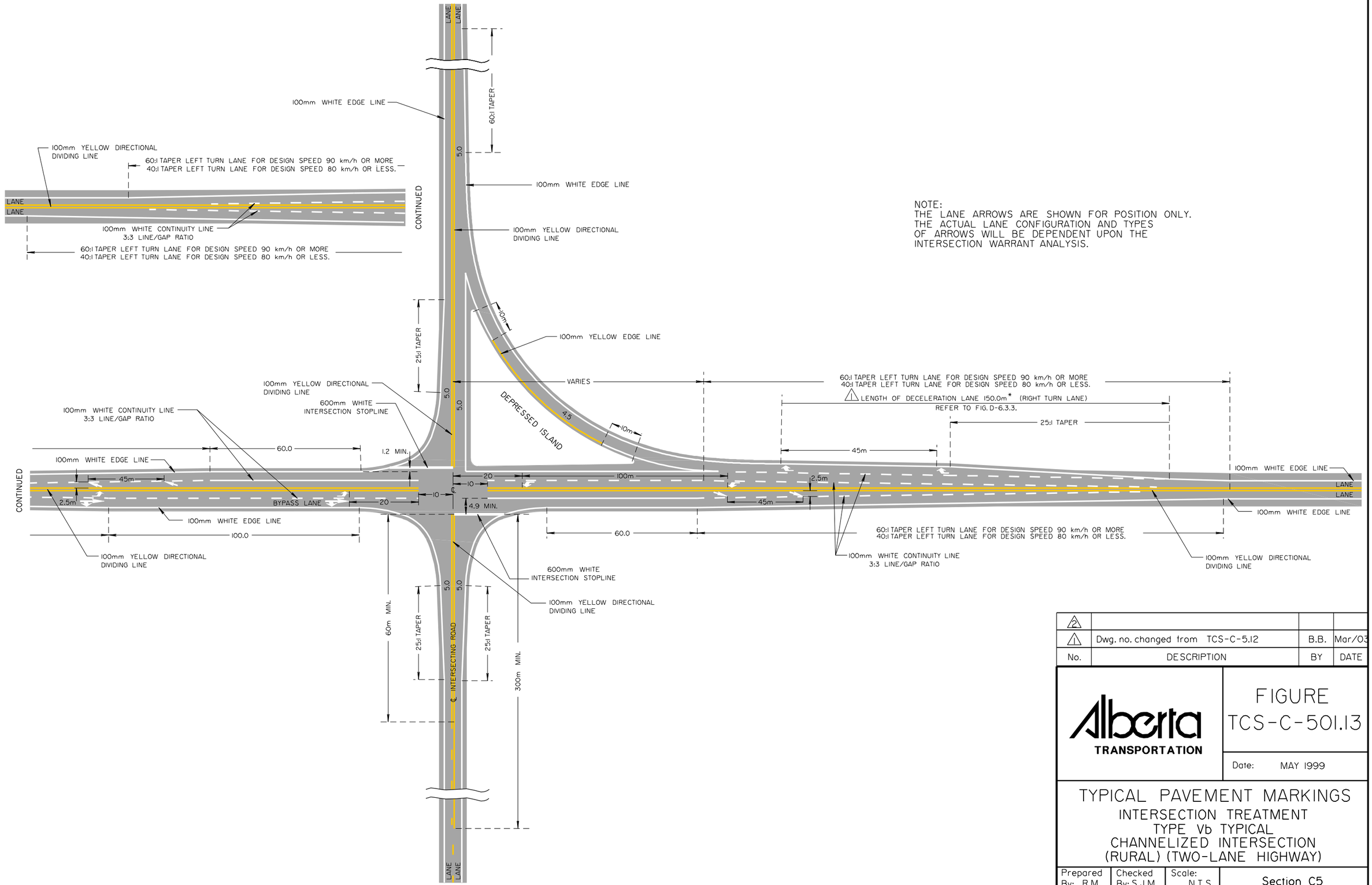
FIGURE
TCS-C-501.12

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

INTERSECTION TREATMENT (TYPE IVd) (TWO-LANE HIGHWAY)

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



NOTE:
THE LANE ARROWS ARE SHOWN FOR POSITION ONLY.
THE ACTUAL LANE CONFIGURATION AND TYPES
OF ARROWS WILL BE DEPENDENT UPON THE
INTERSECTION WARRANT ANALYSIS.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.12	B.B.	Mar/03

Alberta TRANSPORTATION

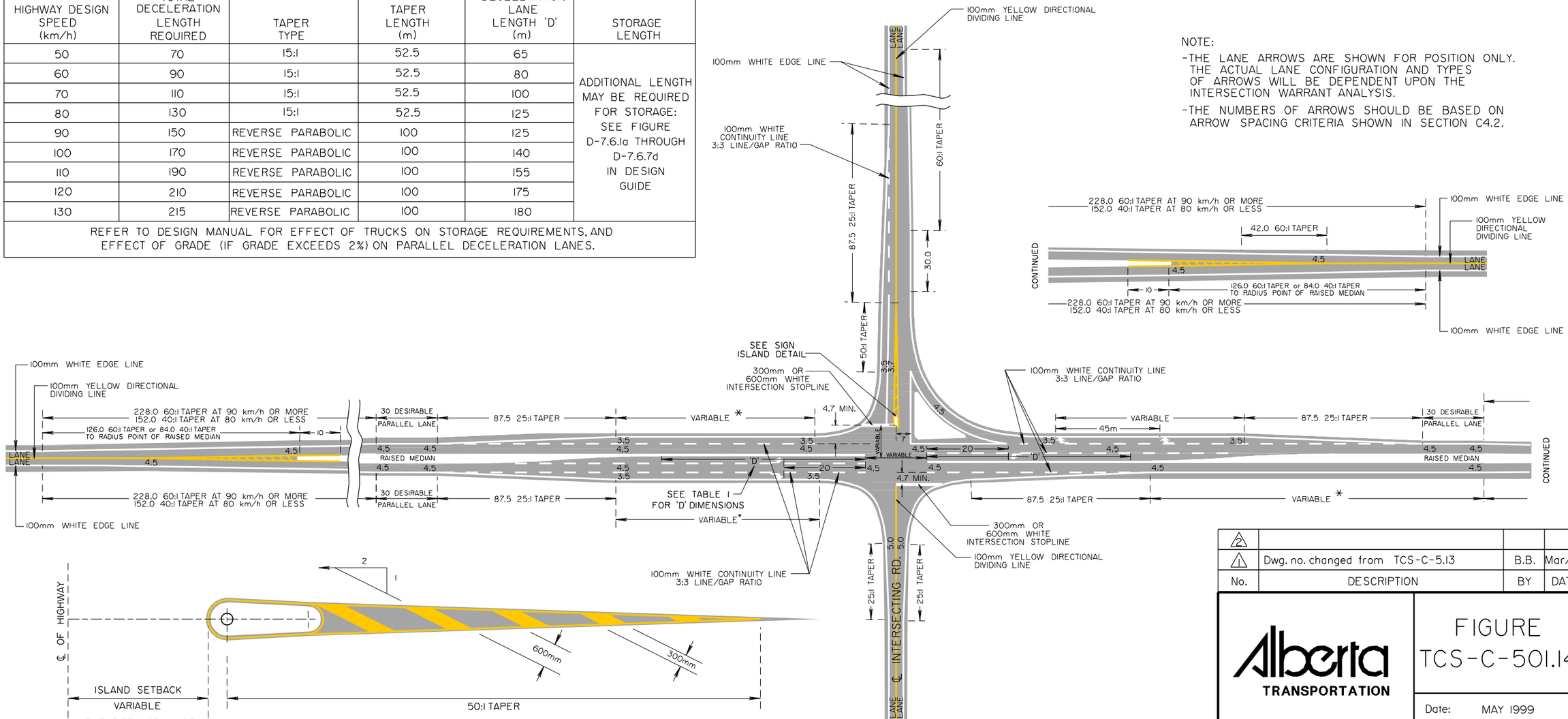
FIGURE
TCS-C-501.13

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERSECTION TREATMENT
TYPE Vb TYPICAL
CHANNELIZED INTERSECTION
(RURAL) (TWO-LANE HIGHWAY)

Prepared By: R.M.	Checked By: S.J.M	Scale: N.T.S.	Section C5

TABLE 1: LENGTH OF DECELERATION TAPER AND LANE FOR LEFT TURNS AT CHANNELIZED INTERSECTIONS					
HIGHWAY DESIGN SPEED (km/h)	TOTAL DECELERATION LENGTH REQUIRED	TAPER TYPE	TAPER LENGTH (m)	DECELERATION LANE LENGTH 'D' (m)	STORAGE LENGTH
50	70	15:1	52.5	65	ADDITIONAL LENGTH MAY BE REQUIRED FOR STORAGE: SEE FIGURE D-7.6.1a THROUGH D-7.6.7d IN DESIGN GUIDE
60	90	15:1	52.5	80	
70	110	15:1	52.5	100	
80	130	15:1	52.5	125	
90	150	REVERSE PARABOLIC	100	125	
100	170	REVERSE PARABOLIC	100	140	
110	190	REVERSE PARABOLIC	100	155	
120	210	REVERSE PARABOLIC	100	175	
130	215	REVERSE PARABOLIC	100	180	
REFER TO DESIGN MANUAL FOR EFFECT OF TRUCKS ON STORAGE REQUIREMENTS, AND EFFECT OF GRADE (IF GRADE EXCEEDS 2%) ON PARALLEL DECELERATION LANES.					



THE DISTANCE MUST BE DETERMINED THROUGH THE USE OF DESIGN VEHICLE TURNING TEMPLATES.

DETAIL - SIGN ISLAND

NOTE:

- THE LANE ARROWS ARE SHOWN FOR POSITION ONLY. THE ACTUAL LANE CONFIGURATION AND TYPES OF ARROWS WILL BE DEPENDENT UPON THE INTERSECTION WARRANT ANALYSIS.
- THE NUMBERS OF ARROWS SHOULD BE BASED ON ARROW SPACING CRITERIA SHOWN IN SECTION C4.2.

* THIS DIMENSION IS VARIABLE. VALUE IS SELECTED TO ALLOW TAPERS FOR BOTH SIDES OF HIGHWAY TO BEGIN AT THE SAME POINT (AT INTRODUCTION OF RAISED MEDIAN). REFER TO FIGURE D-6.3.3 & D-6.3.4 FOR ACCELERATION AND DECELERATION LENGTHS.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.13	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE TCS-C-501.14

Date: MAY 1999

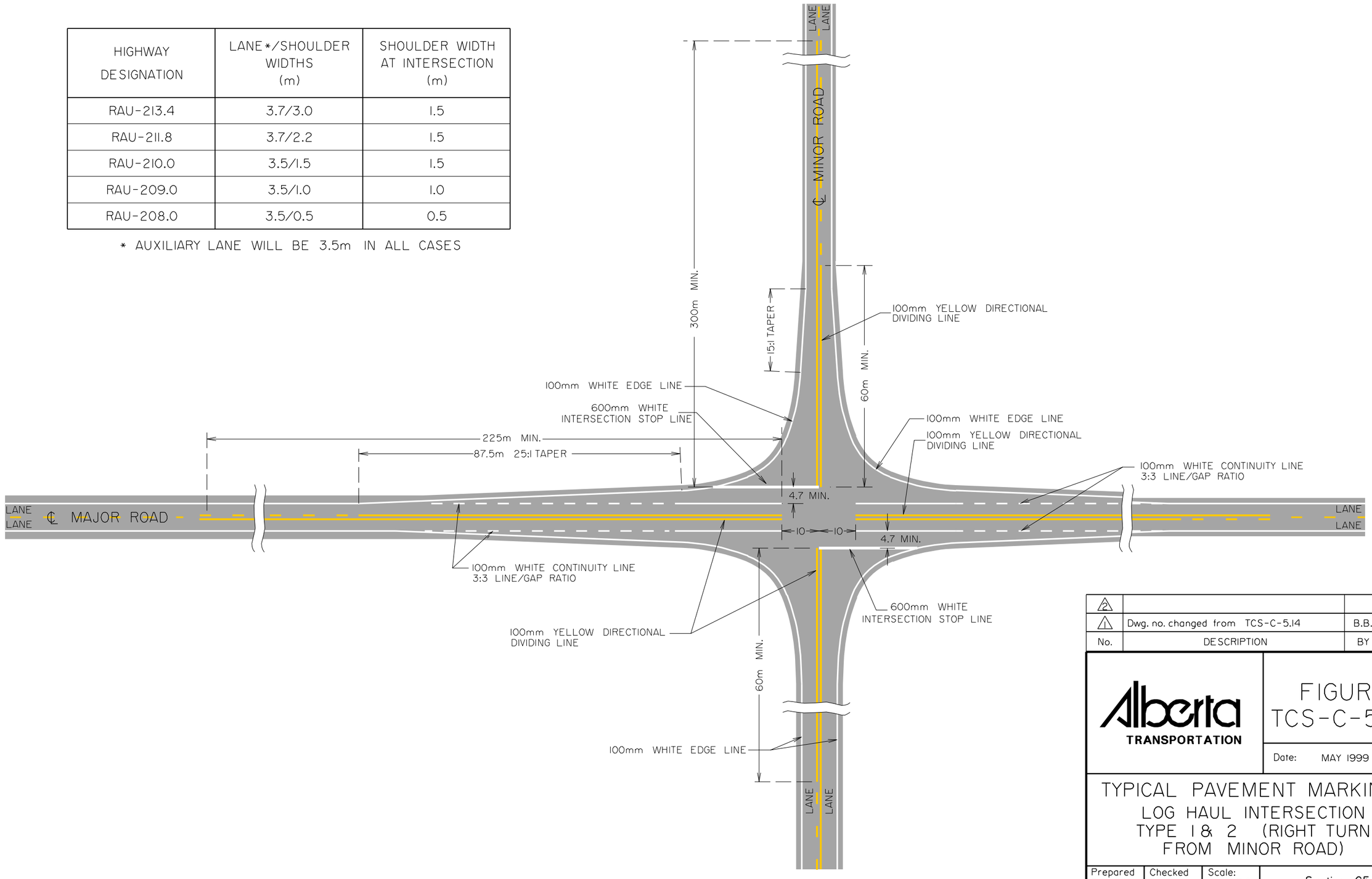
TYPICAL PAVEMENT MARKINGS

TYPICAL CHANNELIZED INTERSECTION TYPE Vc SEMI-URBAN (RAISED ISLANDS AND MEDIANS) TWO-LANE HIGHWAY

Prepared By: R.M.	Checked By: S.J.M	Scale: N.T.S.	Section C5

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.14	B.B.	Mar/03

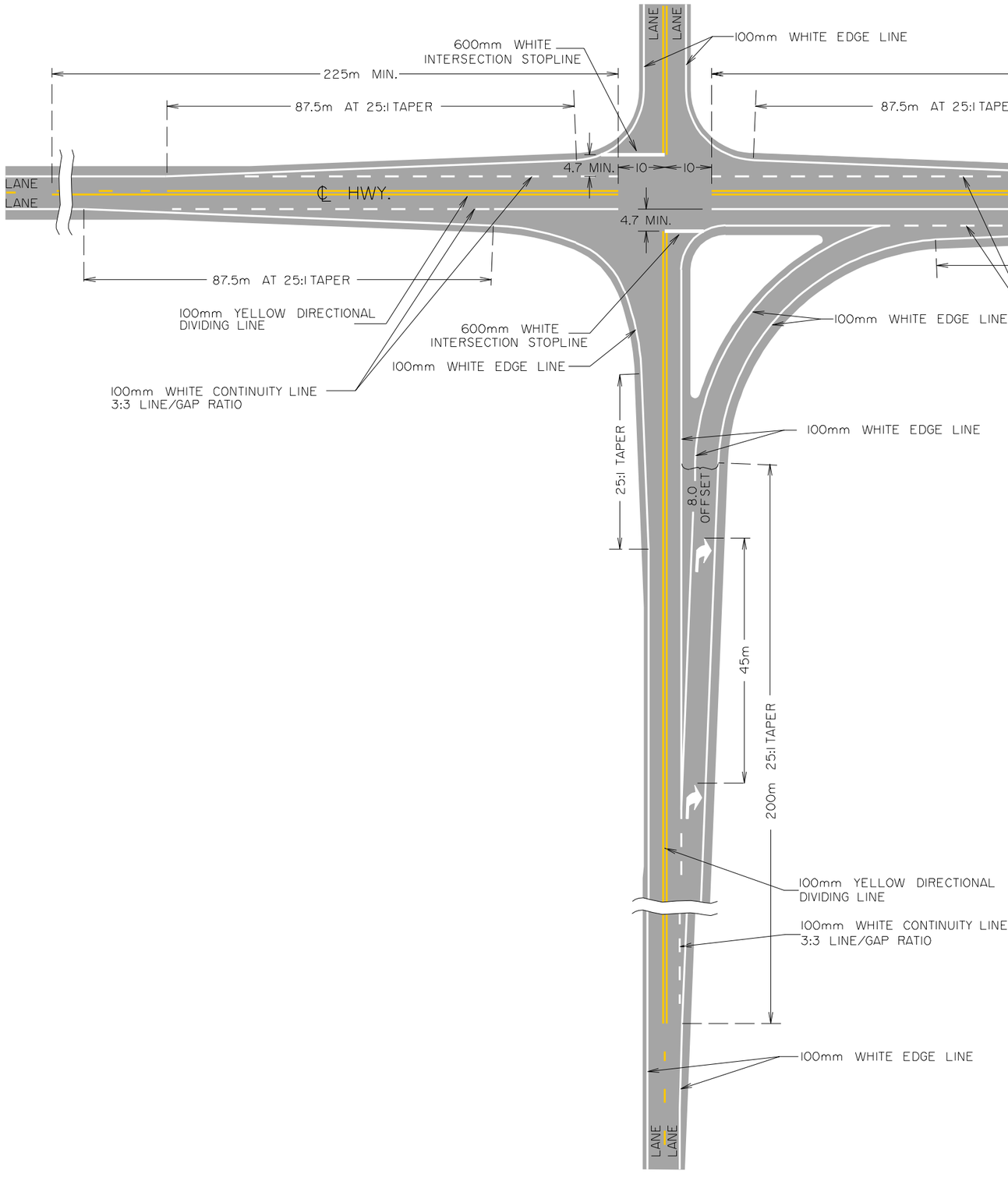
Alberta TRANSPORTATION

FIGURE TCS-C-505

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LOG HAUL INTERSECTION TYPE 1 & 2 (RIGHT TURN FROM MINOR ROAD)

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.15	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE
TCS-C-505.1

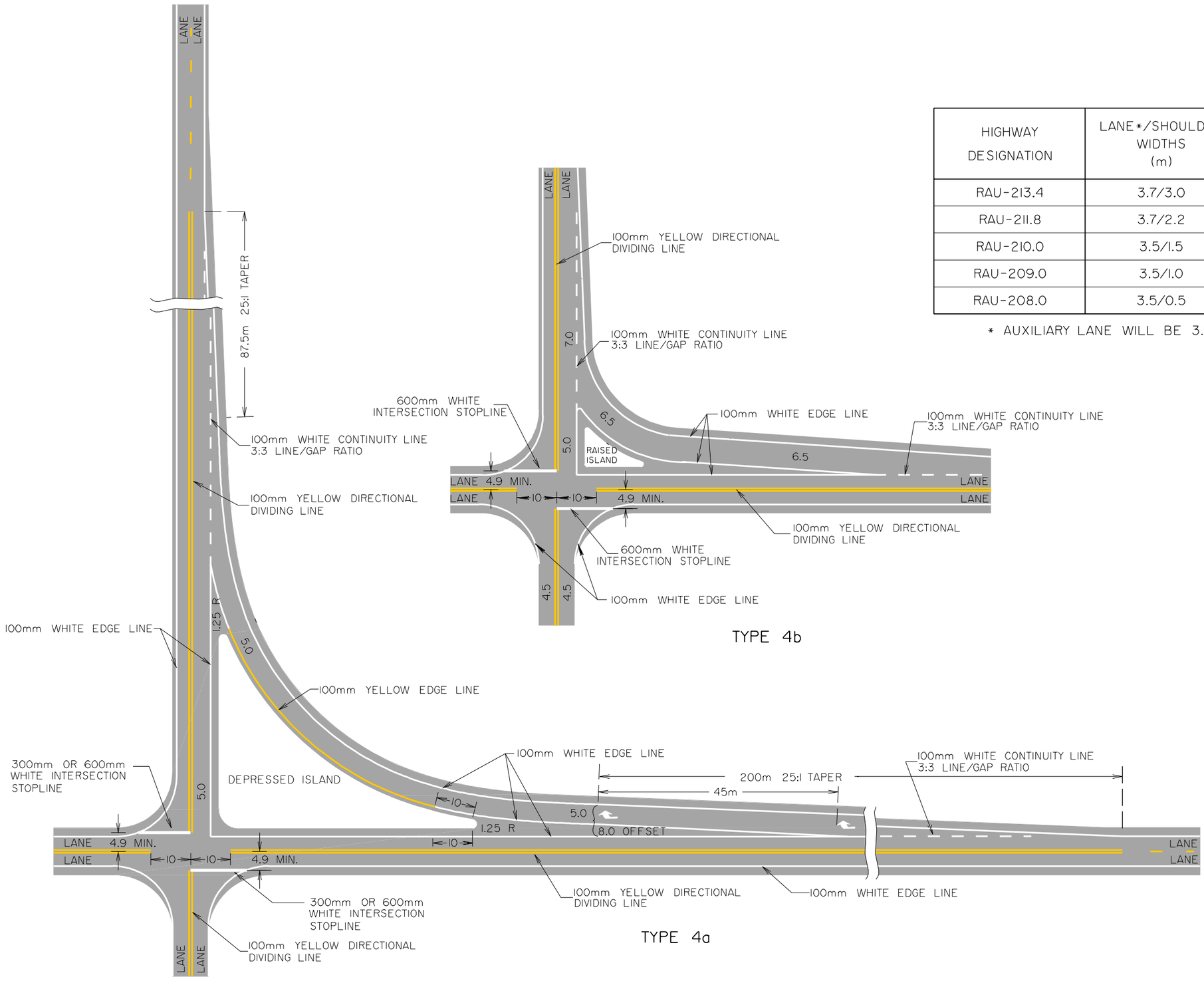
Date: MAY 1999

TYPICAL PAVEMENT MARKINGS LOG HAUL INTERSECTION TYPE 3 (LEFT OR RIGHT TURN FROM MINOR ROAD)

Prepared By: R.M.	Checked By: S.M.	Scale: N.T.S.	Section C5

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.16	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE TCS-C-505.2

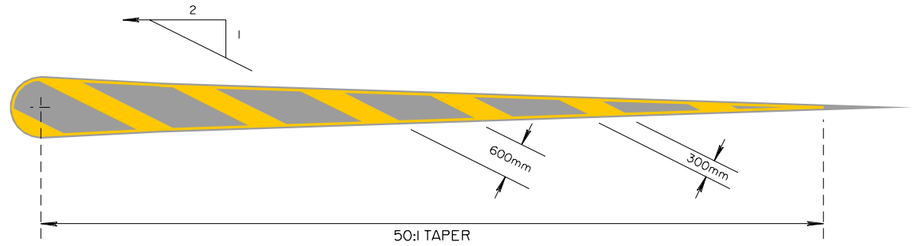
Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LOG HAUL INTERSECTION
TYPE 4a & 4b
RIGHT TURN FROM MAJOR ROAD
(RURAL/URBAN CHANNELIZED)

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C5

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH "W" AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES



DETAIL - MARKED ISLAND

NOTES:
ISLAND CAN BE DEPRESSED OR AT-GRADE(PAINTED), DEPENDING ON DRAINAGE REQUIREMENTS AND LOCAL PREFERENCES. (NOTE REFERS TO LEFT TURN ISLAND ONLY)

SEE FIGURE TCS-C-2.02 FOR TRANSITION DETAIL

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.17	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE TCS-C-505.3

Date: MAY 1999

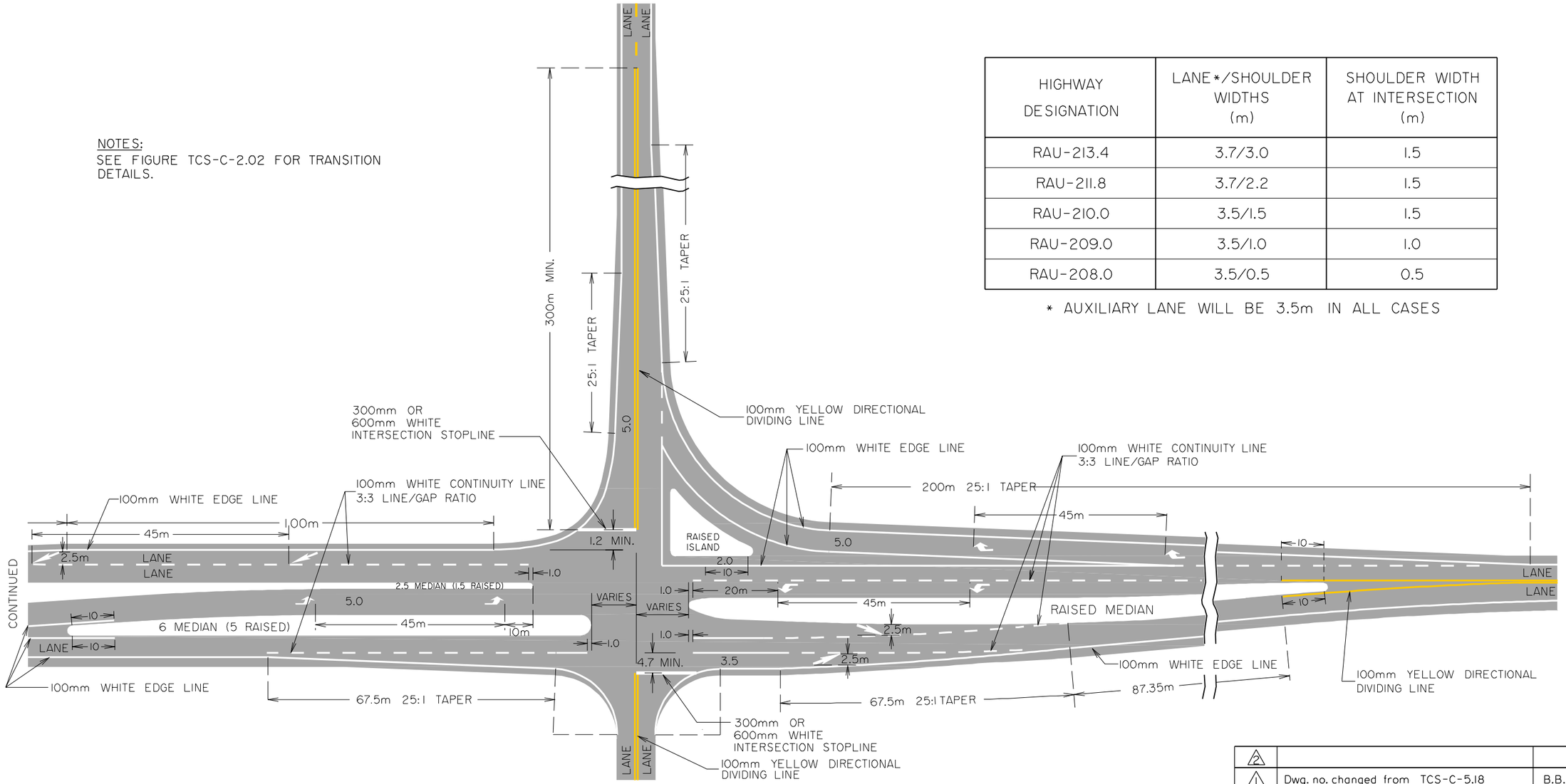
TYPICAL PAVEMENT MARKINGS
LOG HAUL INTERSECTION
TYPE 5a
LEFT TURN FROM MAJOR ROAD (RURAL DEPRESSED MEDIAN)

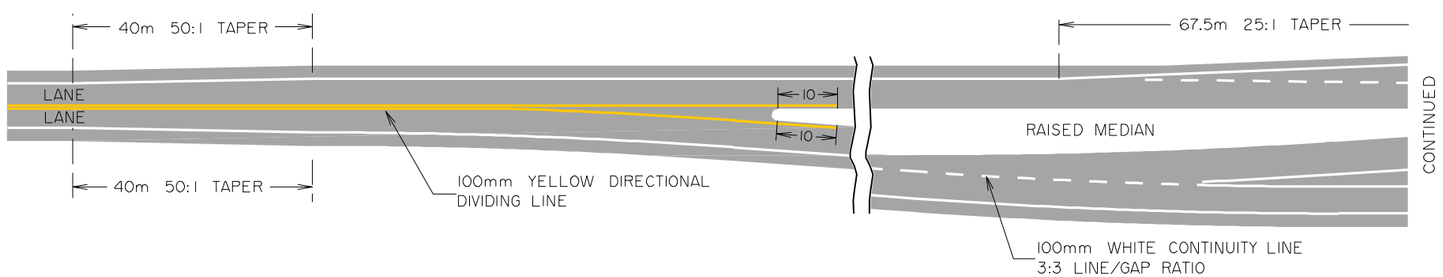
Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C5

NOTES:
SEE FIGURE TCS-C-2.02 FOR TRANSITION DETAILS.

HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES





No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.18	B.B.	Mar/03

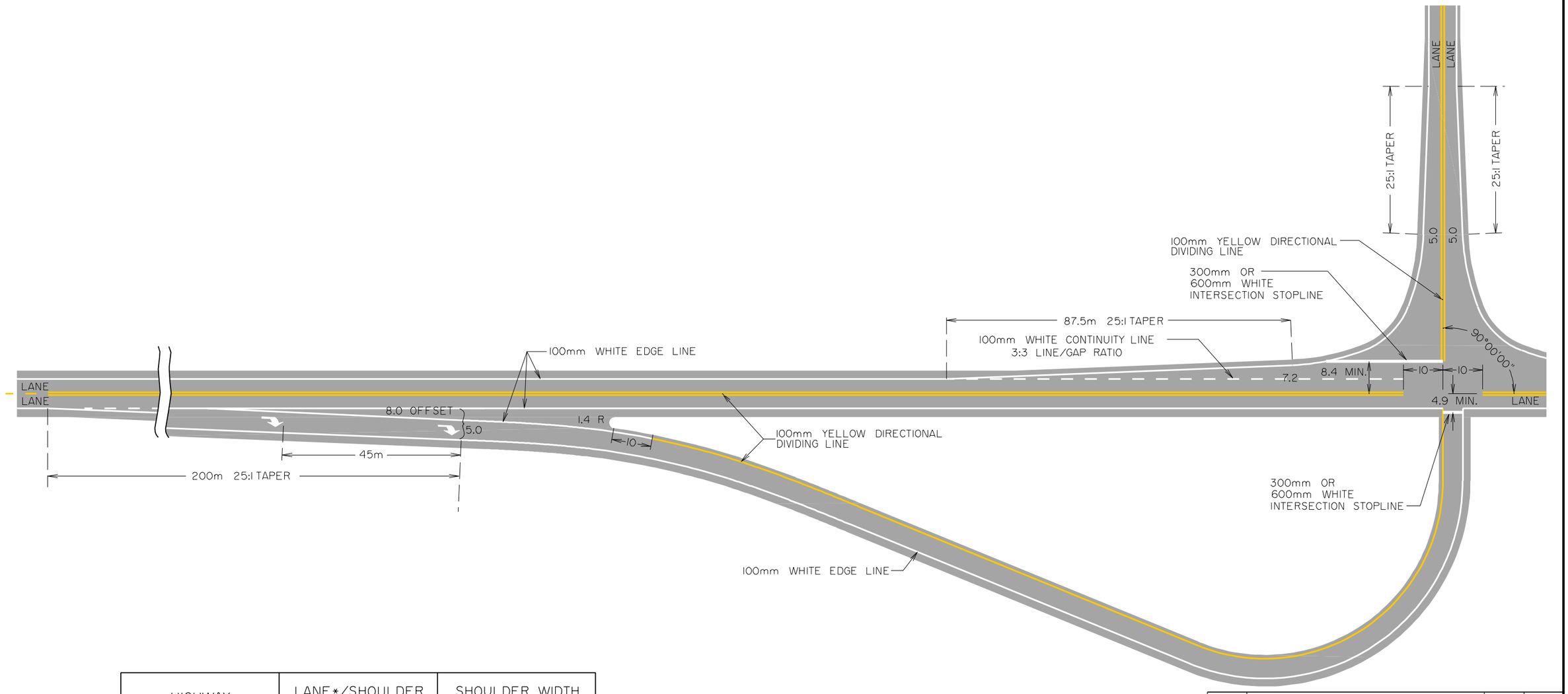
Alberta TRANSPORTATION

FIGURE
TCS-C-505.4

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LOG HAUL INTERSECTION
TYPE 5b
LEFT TURN FROM MAJOR ROAD
(URBAN)

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



HIGHWAY DESIGNATION	LANE*/SHOULDER WIDTHS (m)	SHOULDER WIDTH AT INTERSECTION (m)
RAU-213.4	3.7/3.0	1.5
RAU-211.8	3.7/2.2	1.5
RAU-210.0	3.5/1.5	1.5
RAU-209.0	3.5/1.0	1.0
RAU-208.0	3.5/0.5	0.5

* AUXILIARY LANE WILL BE 3.5m IN ALL CASES

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.19	B.B.	Mar/03

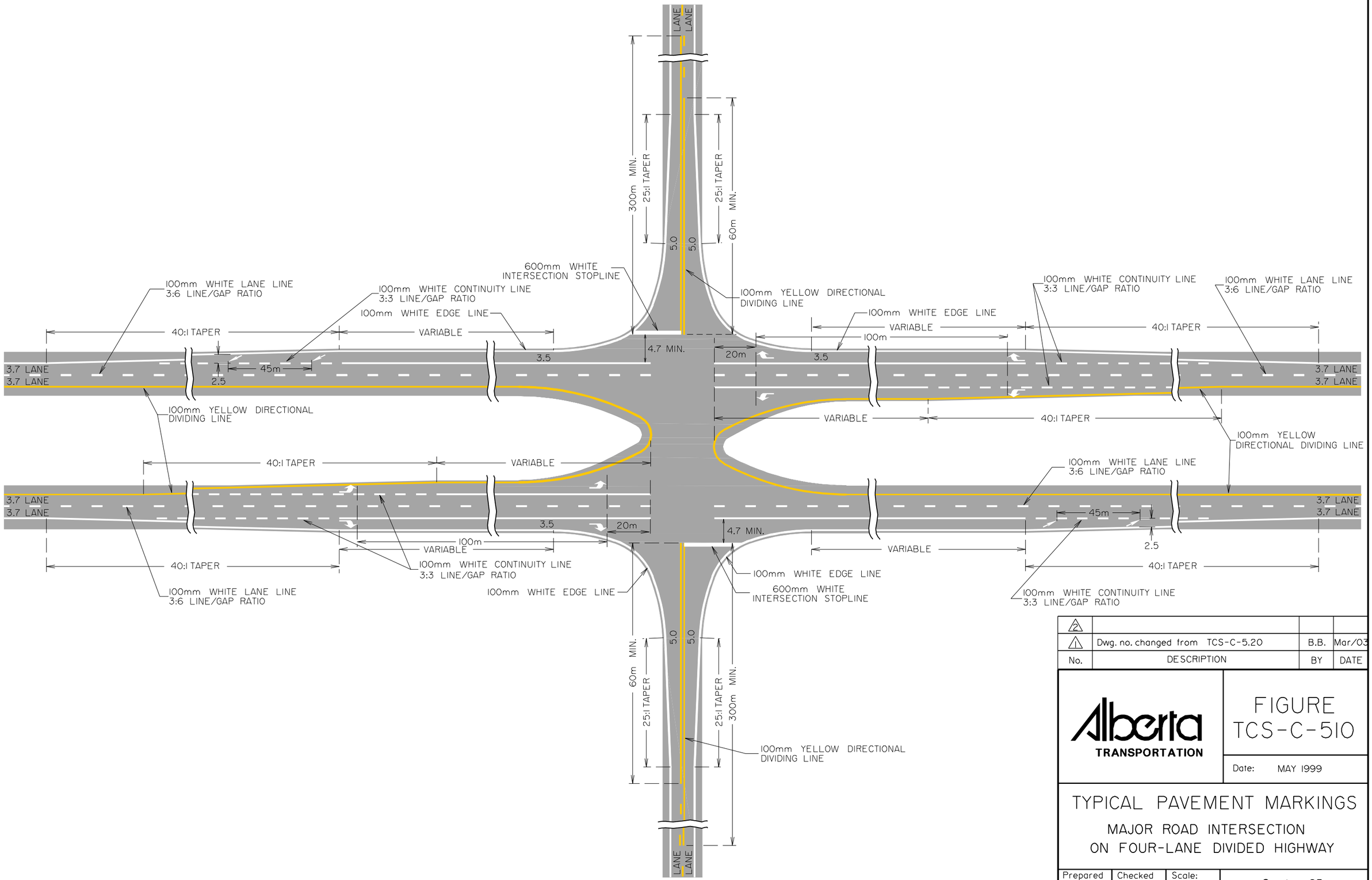
Alberta TRANSPORTATION

FIGURE
TCS-C-505.5

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
LOG HAUL INTERSECTION
TYPE 6
JUGHANDLE (RIGHT TURN OFF-RAMP AND 90° CROSSING)

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.20	B.B.	Mar/03

Alberta TRANSPORTATION

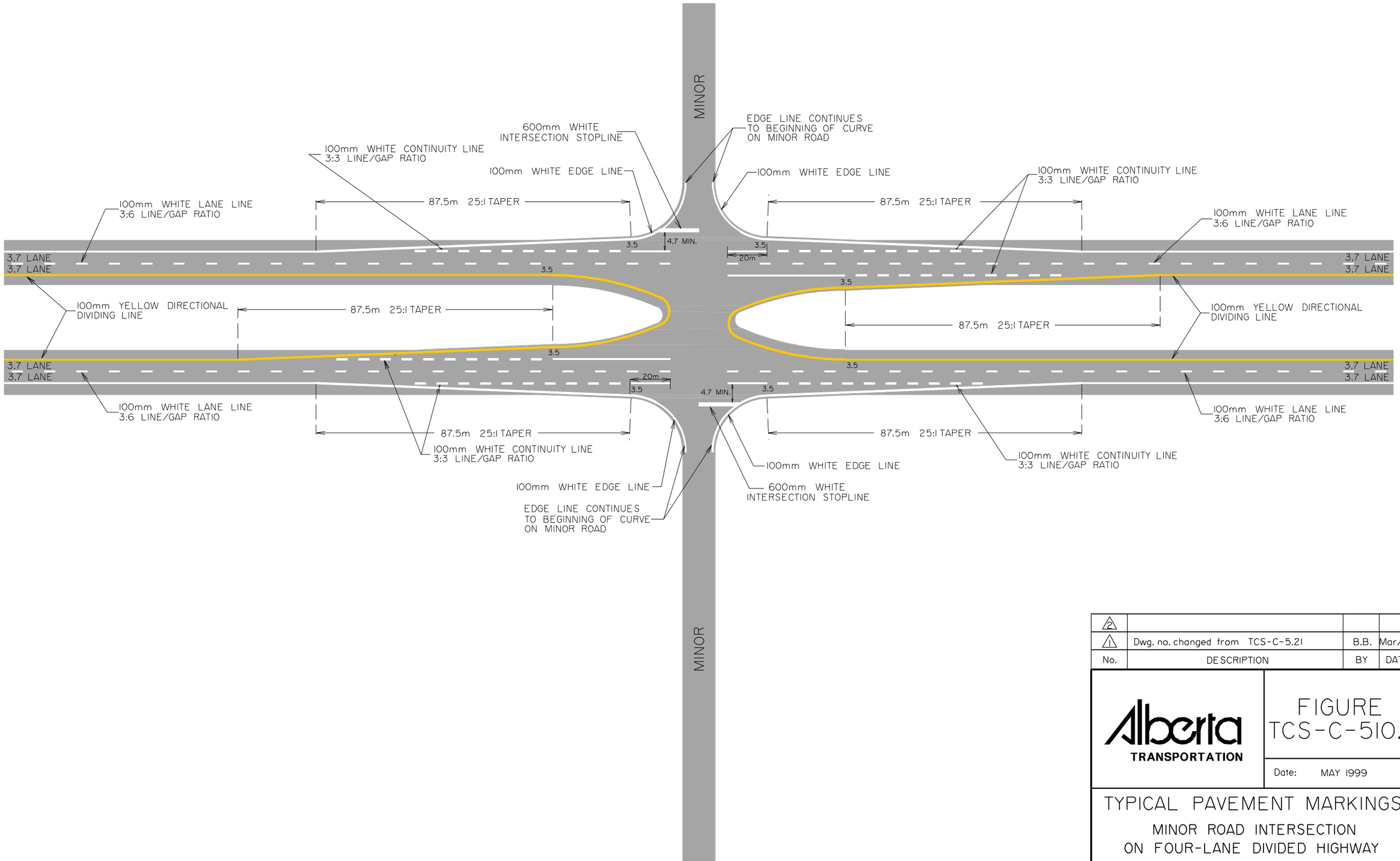
FIGURE
TCS-C-510

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

MAJOR ROAD INTERSECTION ON FOUR-LANE DIVIDED HIGHWAY

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.21	B.B.	Mar/03

Alberta
TRANSPORTATION

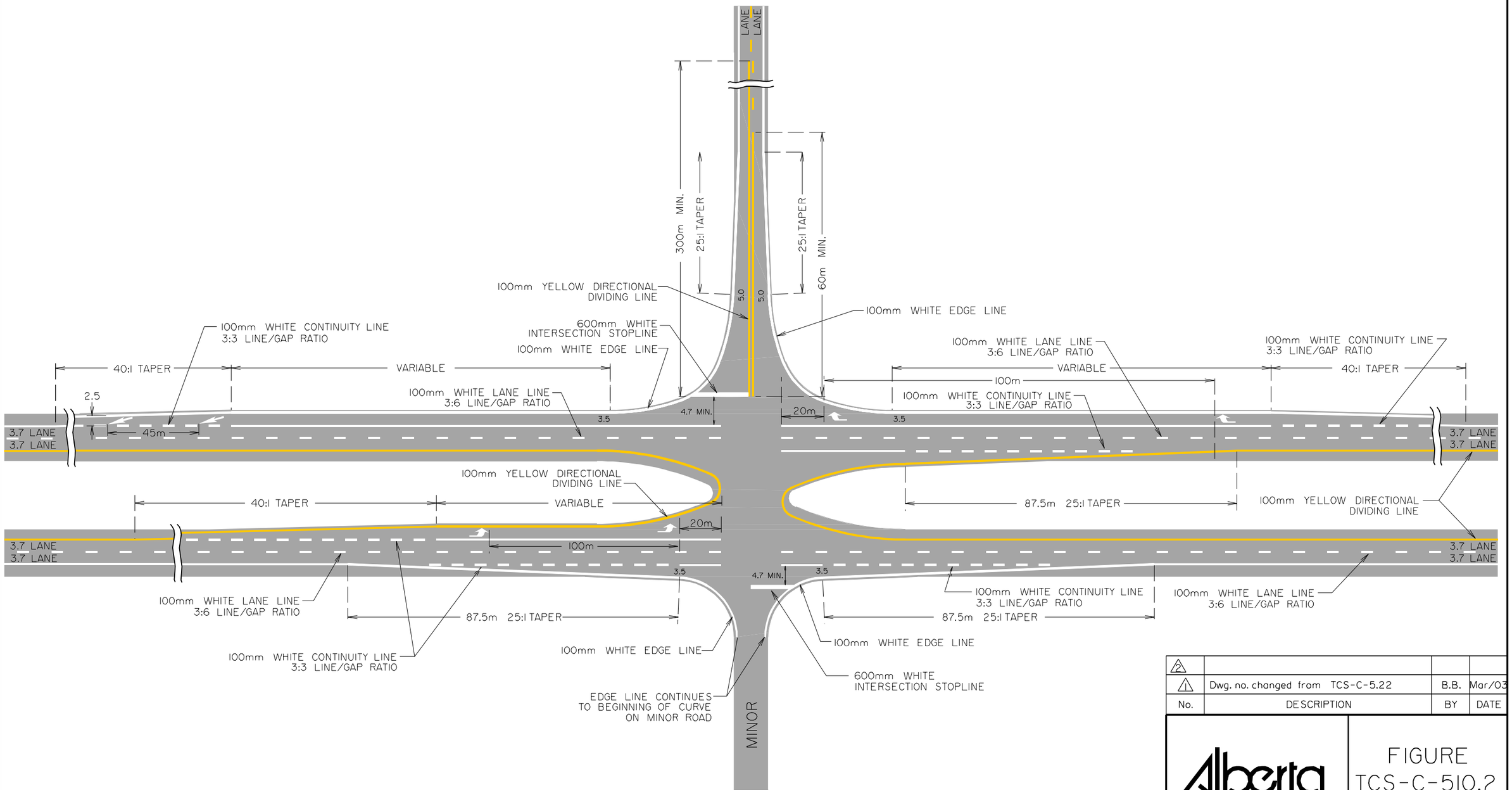
FIGURE
TCS-C-510.1

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

MINOR ROAD INTERSECTION ON FOUR-LANE DIVIDED HIGHWAY

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.22	B.B.	Mar/03

Alberta TRANSPORTATION

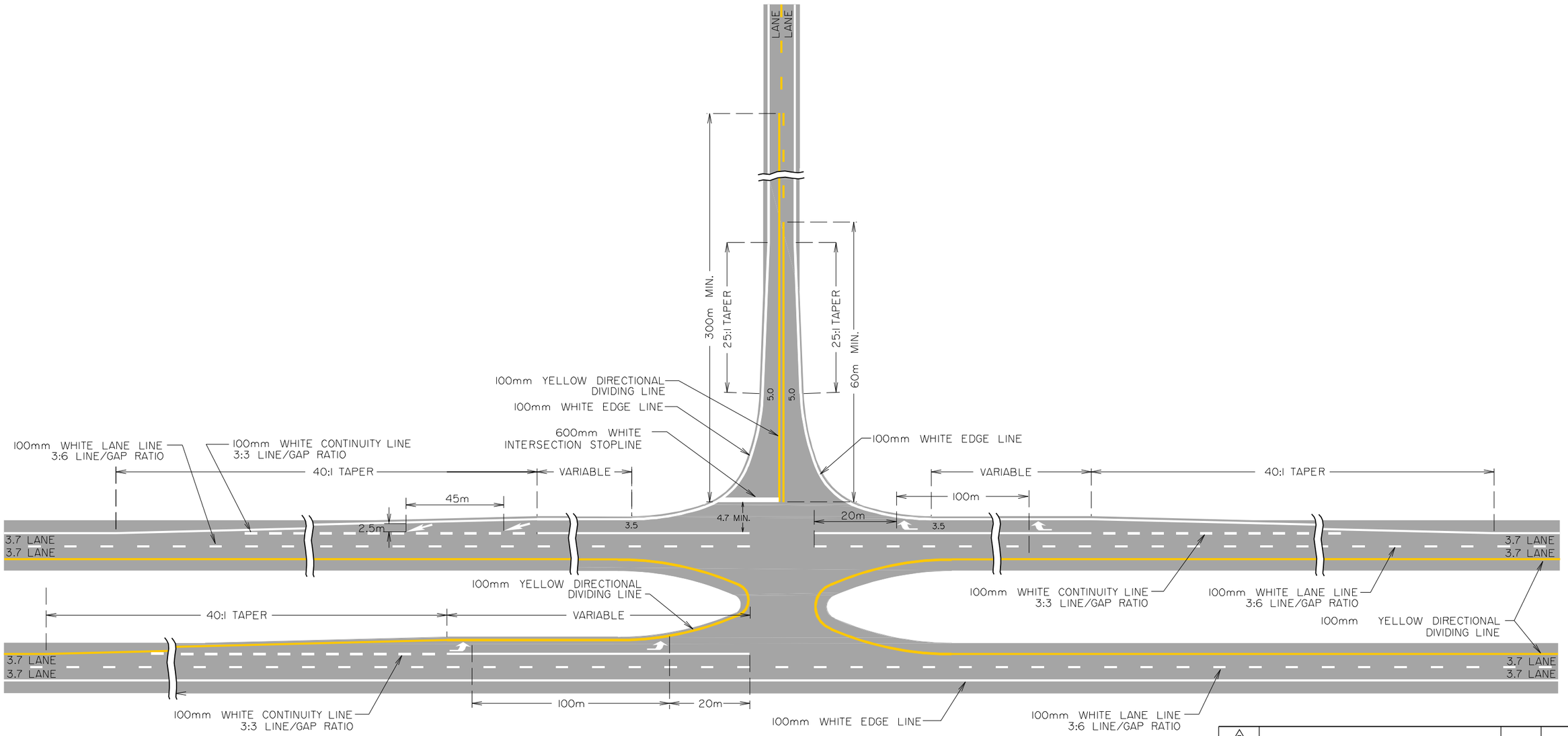
FIGURE
TCS-C-510.2

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

MAJOR-MINOR ROAD INTERSECTION ON FOUR-LANE DIVIDED HIGHWAY

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.23	B.B.	Mar/03

Alberta TRANSPORTATION

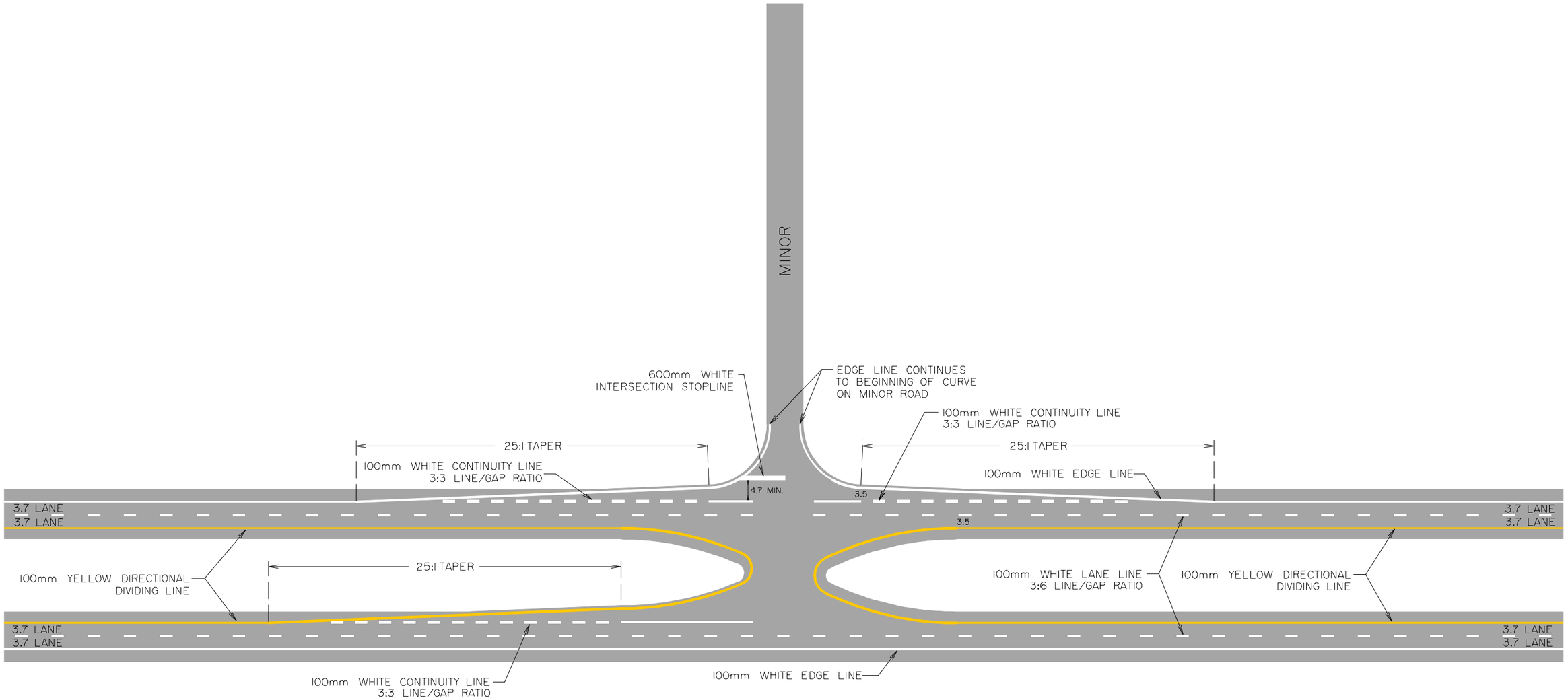
FIGURE TCS-C-510.3

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

MAJOR "T" INTERSECTION ON FOUR-LANE DIVIDED HIGHWAY

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.24	B.B.	Mar/03

Alberta TRANSPORTATION

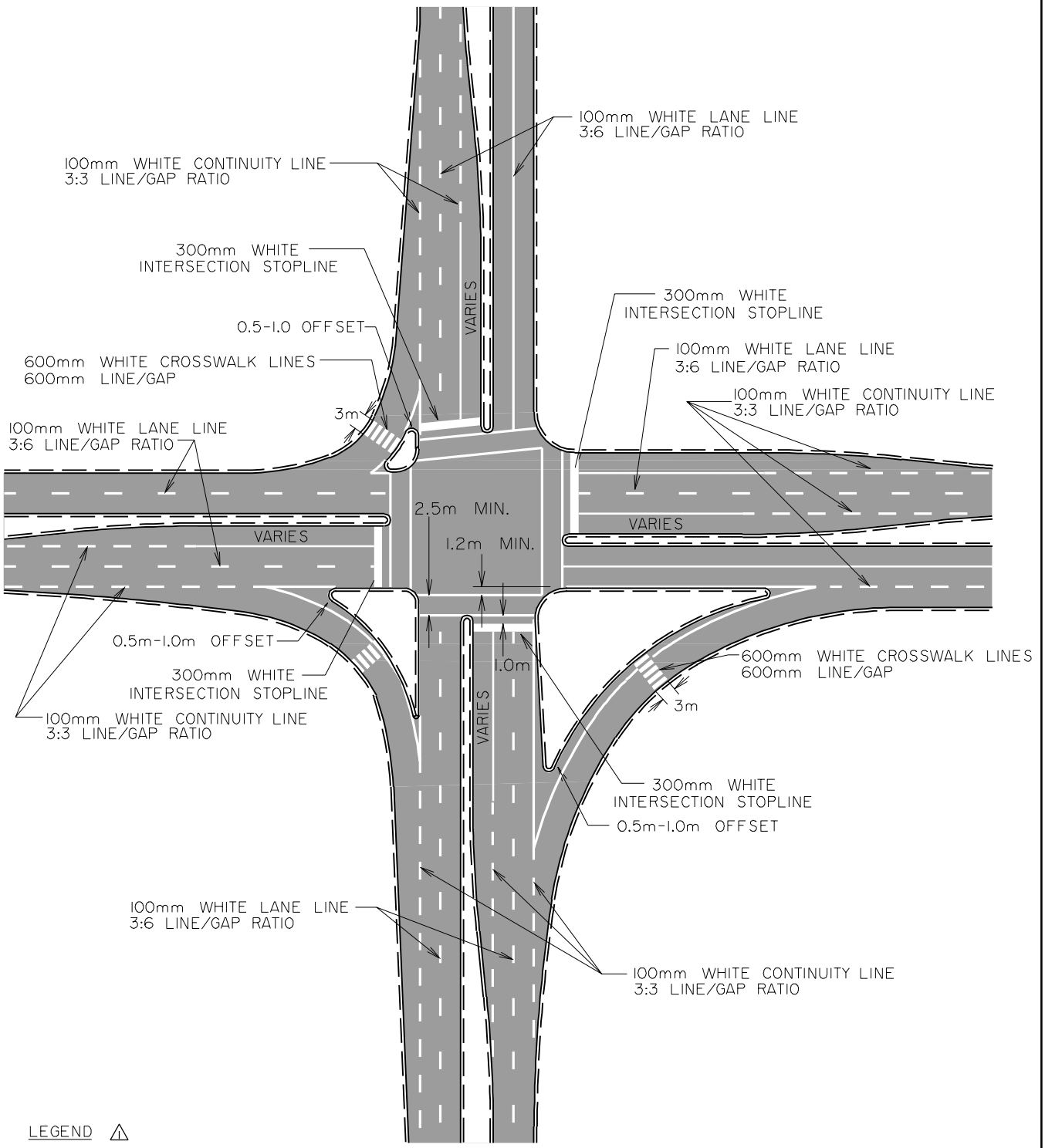
FIGURE
TCS-C-510.4

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

MINOR "T" INTERSECTION ON FOUR-LANE DIVIDED HIGHWAY

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



LEGEND ⚠1

CURB AND GUTTER

NOTE: ⚠1

THE FOUR INTERSECTION LEGS ARE COMBINED FOR ILLUSTRATIVE PURPOSES ONLY.

No.	DESCRIPTION	BY	DATE
⚠2			
⚠1	Dwg. no. changed from TCS-C-5.25 Legend and general note added	B.B.	Mar/03

Alberta TRANSPORTATION

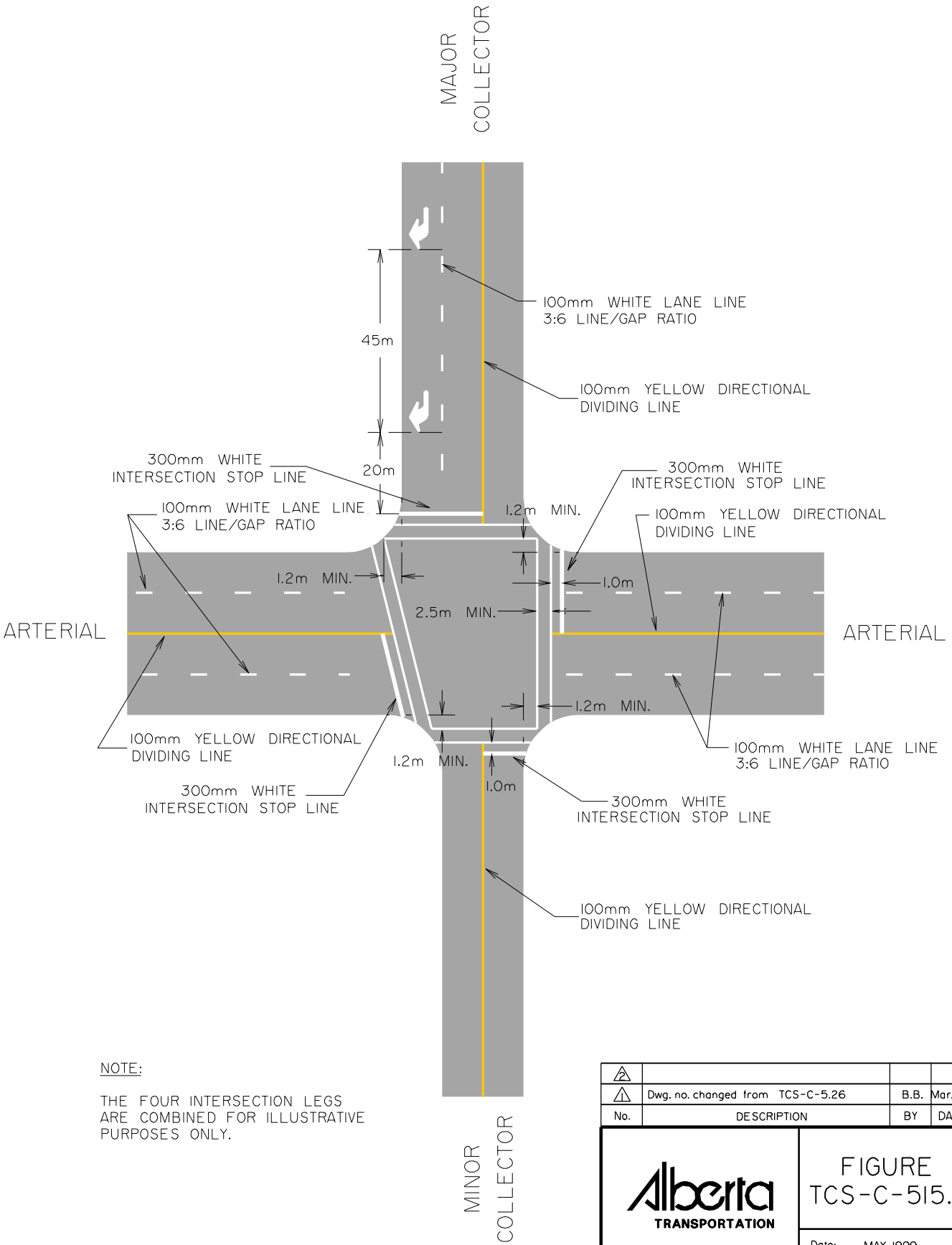
FIGURE
TCS-C-515

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

URBAN FOUR LANE DIVIDED - FOUR LANE DIVIDED INTERSECTION

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C5



NOTE:

THE FOUR INTERSECTION LEGS ARE COMBINED FOR ILLUSTRATIVE PURPOSES ONLY.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-5.26	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE
TCS-C-515.1

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

URBAN FOUR LANE UNDIVIDED ARTERIAL-COLLECTOR INTERSECTION

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C5

C6 Interchanges

C6.1 General

An interchange is a system of interconnecting roadways in conjunction with one or more grade separations that provides for the movement of traffic between two or more roadways or highways on different levels. Interchanges normally require ramps and loops to accommodate turning movements.

Considering the need for high capacity and high traveling speeds, appropriate level of service, and maximum safety, it is desirable to provide uniformity in application of pavement markings at exit and entrance areas.

From the standpoint of driver expectancy and safety, it is essential that all interchange ramps be marked with wide lines. The intent of using wide lines is to provide emphasis so that drivers can easily recognize the geometry of exit or entrance areas in the high speed environment of an interchange.

C6.1.1 Use of Chevron Markings at Gore Areas

When pavement markings are needed for gore areas at pavement transition areas, the following guidelines should be used to select the type of markings:

1. The markings shall consist of 200 mm wide lines outlining the gore area. Chevron paint markings (white) may be added within a gore outline to provide emphasis. Chevron pavement markings are illustrated on all drawings illustrating various interchange elements.
2. On divided highways with an AADT exceeding 12,000, chevrons should generally be provided at all gore areas adjacent to the through lanes (i.e., at the merge and diverge areas on the main alignment).
3. On divided highways with an AADT less than 12,000, chevrons should generally be provided at the diverge gore area if at least 25% of the through traffic is expected to use the off-ramp. Chevrons at the merge area are generally not provided unless the need is identified by the engineer responsible for design or traffic operations.
4. Interchange exit terminals (refer to section C6.5) generally do not require chevron markings, however, exceptions may be made based on operating speed at the gore, traffic volume, traffic operations, and visibility of the gore area.

C6.2 Off-Ramps

A wide edge line should be introduced 8 seconds of travel time before the pavement starts to widen for an off-ramp. The longer amount of time is to allow the driver to make the decision to leave the freeway at this exit. The wide line should return to 100 mm width at a point 10 m beyond the end of the nose of the off-ramp.

The continuity line should also be a wide line and must continue throughout the entire length of the taper. This is shown in Figures TCS-C-601, TCS-C-605 and TCS-C-610.

C6.3 On-Ramps

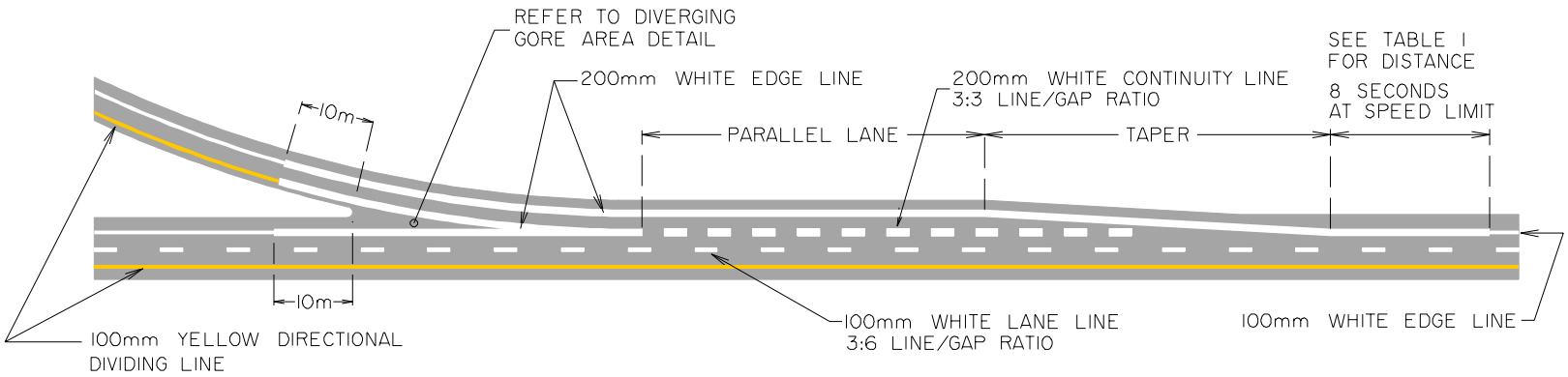
A wide edge line should be introduced 4 seconds of travel time at the posted speed limit before the nose of the gore on on-ramps to a divided highway to alert the driver of the upcoming change in geometry and the likelihood of merging traffic. It should also be introduced on the ramp 50 m prior to the nose. The continuity line should be a wide line and must continue throughout the entire length of the taper. This is shown in Figures TCS-C-615 and TCS-C-620.

C6.4 Weaving Lanes

Weaving lanes are a combination of on and off-ramps. A wide edge line shall extend for 12 seconds of travel time from the nose of the gore at the off-ramp, back along the weaving lane. If the weaving lane is less than 650 m long, the wide edge line shall extend along the whole length of the weaving lane. A wide continuity line shall extend back for the same distance as the wide edge line. The pavement markings for a weaving lane are shown in Figure TCS-C-625.

C6.5 Exit Terminals

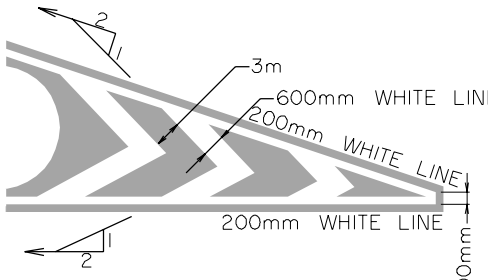
Exit terminals occur at the end of a freeway section. Pavement markings for exit terminals are shown in Figures TCS-C-630 and TCS-C-635.



PARALLEL LANE WITH WIDE LINES

⚠ NOTES:

1) ON DIVIDED HIGHWAYS WITH AADT > 12,000, CHEVRON MARKINGS SHOULD BE PROVIDED AT ALL GORE AREAS.
2) ON DIVIDED HIGHWAYS WITH AADT < 12,000, CHEVRON MARKINGS SHOULD BE PROVIDED:
   i) AT THE DIVERGE GORE AREA IF AT LEAST 25% OF THE THROUGH TRAFFIC IS EXPECTED TO USE THE OFF-RAMP.
   ii) AT THE MERGE GORE AREA BASED ON OPERATIONAL OR SAFETY CONCERNS.
3) DISTANCES AND DIMENSIONS MAY HAVE TO BE ADJUSTED ACCORDING TO INDIVIDUAL CIRCUMSTANCES.



DIVERGING
GORE AREA MARKING
(OPTIONAL)

TABLE I	
SPEED LIMIT km/h	DISTANCE metres
110	245
100	220
90	200
80	180
70	155
60	135
50	110

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-6.01 Notes revised.	B.B.	Mar/03

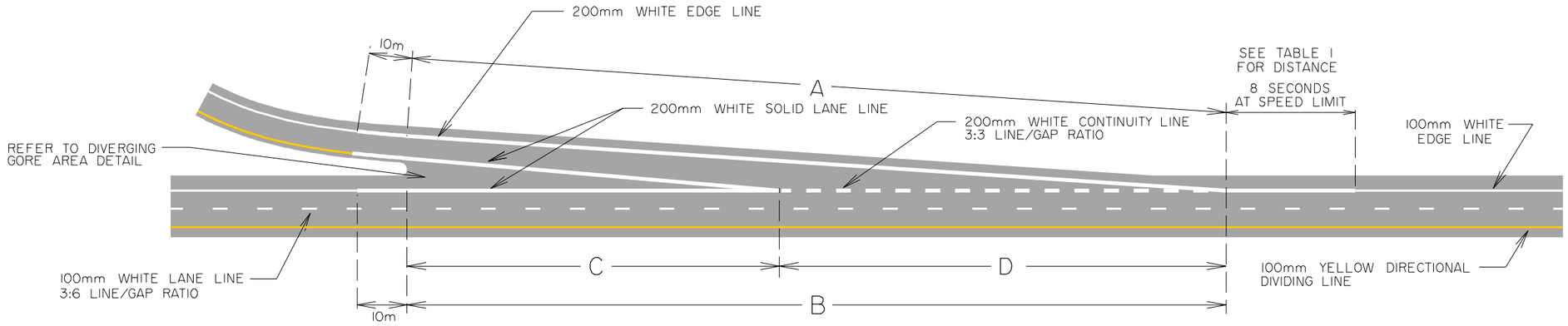
Alberta TRANSPORTATION

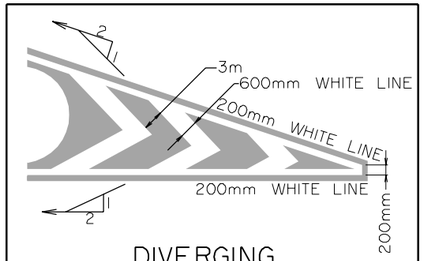
FIGURE
TCS-C-601

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERCHANGE PARALLEL
DECELERATION LANE

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C6





DIVERGING
GORE AREA MARKING
(OPTIONAL)

TAPER LENGTH DATA

DESIGN SPEED	TAPER RATIO	DEFLECTION ANGLE	A	B	C	D
130	30:1	1°54'33"	330.18	330.0	154.4	175.6
80-100	25:1	2°17'26"	275.21	275.0	128.57	146.43
80-100	20:1	2°51'45"	220.27	220.0	102.8	117.2
60	15:1	3°48'50"	165.37	165.0	77.14	87.86

TABLE I

SPEED LIMIT km/h	DISTANCE metres
110	245
100	220
90	200
80	180
70	155
60	135
50	110

⚠ NOTES:

1) ON DIVIDED HIGHWAYS WITH AADT > 12,000, CHEVRON MARKINGS SHOULD BE PROVIDED AT ALL GORE AREAS.
2) ON DIVIDED HIGHWAYS WITH AADT < 12,000, CHEVRON MARKINGS SHOULD BE PROVIDED:
   i) AT THE DIVERGE GORE AREA IF AT LEAST 25% OF THE THROUGH TRAFFIC IS EXPECTED TO USE THE OFF-RAMP.
   ii) AT THE MERGE GORE AREA BASED ON OPERATIONAL OR SAFETY CONCERNS.
3) DISTANCES AND DIMENSIONS MAY HAVE TO BE ADJUSTED ACCORDING TO INDIVIDUAL CIRCUMSTANCES.

No.	DESCRIPTION	BY	DATE
⚠2			
⚠1	Dwg. no. changed from TCS-C-6.02; Notes revised.	B.B.	Mar/03

Alberta TRANSPORTATION

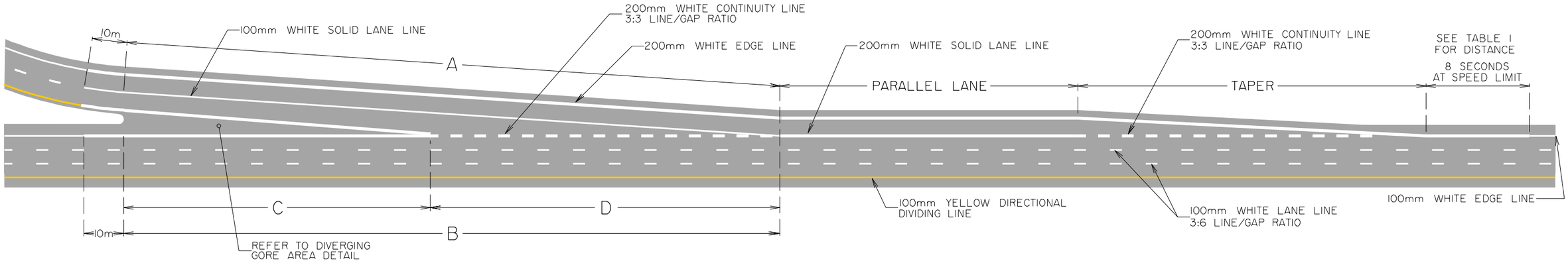
FIGURE
TCS-C-605

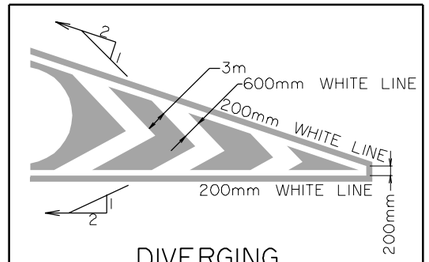
Date: MAY 1999

TYPICAL PAVEMENT MARKINGS

SINGLE LANE OFF RAMP WITH TAPER

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C6





DIVERGING
GORE AREA MARKING
(OPTIONAL)

TAPER LENGTH DATA

DESIGN SPEED	TAPER RATIO	DEFLECTION ANGLE	A	B	C	D
130	30:1	1°54'33"	330.18	330.0	154.4	175.6
80-100	25:1	2°17'26"	275.21	275.0	128.57	146.43
80-100	20:1	2°51'45"	220.27	220.0	102.8	117.2
60	15:1	3°48'50"	165.37	165.0	77.14	87.86

TABLE I

SPEED LIMIT km/h	DISTANCE metres
110	245
100	220
90	200
80	180
70	155
60	135
50	110

NOTES:

EACH SITUATION WILL REQUIRE ASSESSMENT AND JUDGEMENT BY THE ENGINEER

DISTANCES AND DIMENSIONS MAY HAVE TO BE ADJUSTED ACCORDING TO INDIVIDUAL CIRCUMSTANCES.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-6.03	B.B	Mar/03

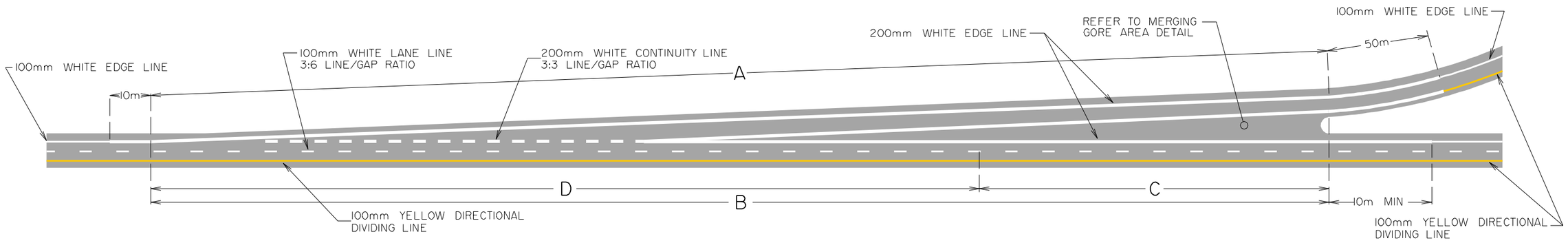
Alberta TRANSPORTATION

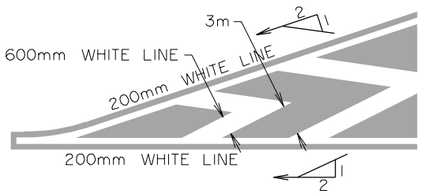
FIGURE
TCS-C-610

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERCHANGE DECELERATION WITH TWO LANE EXIT AND PARALLEL LANE

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C6





MERGING
GORE AREA MARKING
(OPTIONAL)

TAPER LENGTH DATA

DESIGN SPEED	TAPER RATIO	DEFLECTION ANGLE	A	B	C	D
110-130	60:1	0°57'17"	600.08	600.0	180.0	420.0
110-130	55:1	1°02'29"	550.09	550.0	165.0	385.0
110-130	50:1	1°08'45"	500.09	500.0	150.0	350.0
100	40:1	1°25'55"	400.12	400.0	120.0	280.0
100	35:1	1°38'12"	350.12	350.0	105.0	245.0
80	25:1	2°17'26"	250.02	250.0	75.0	175.0
60	20:1	2°51'45"	200.24	200.0	60.0	140.0

NOTES:

EACH SITUATION WILL REQUIRE ASSESSMENT AND JUDGEMENT BY THE ENGINEER

DISTANCES AND DIMENSIONS MAY HAVE TO BE ADJUSTED ACCORDING TO INDIVIDUAL CIRCUMSTANCES.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-6.04	B.B.	Mar/03

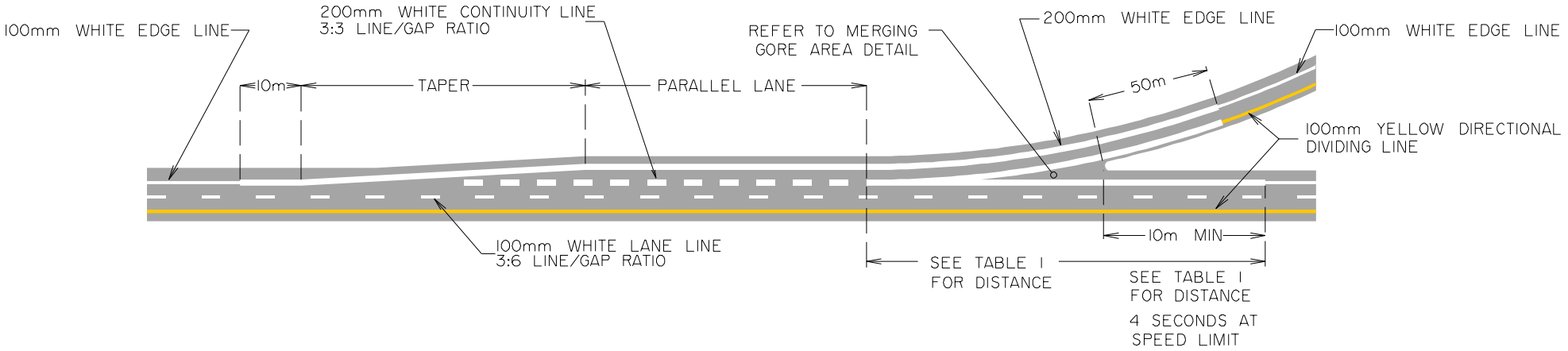
Alberta TRANSPORTATION

FIGURE
TCS-C-615

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERCHANGE ON RAMP
(SINGLE LANE)
LONG TAPER

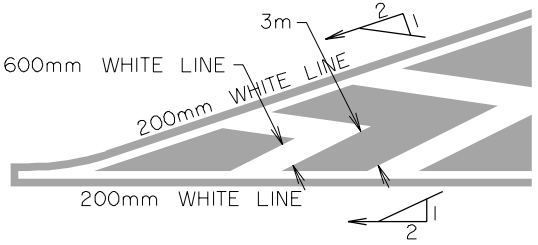
Prepared By: R.M.	Checked By: S.M.	Scale: N.T.S.	Section C6



NOTES:

EACH SITUATION WILL REQUIRE ASSESSMENT AND JUDGEMENT BY THE ENGINEER

DISTANCES AND DIMENSIONS MAY HAVE TO BE ADJUSTED ACCORDING TO INDIVIDUAL CIRCUMSTANCES.



MERGING
GORE AREA MARKING
(OPTIONAL)

TABLE I	
SPEED LIMIT km/h	DISTANCE TRAVELLED IN 4 SECONDS metres
110	120
100	110
90	100
80	90
70	75
60	65
50	55

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-6.05	B.B.	Mar/03

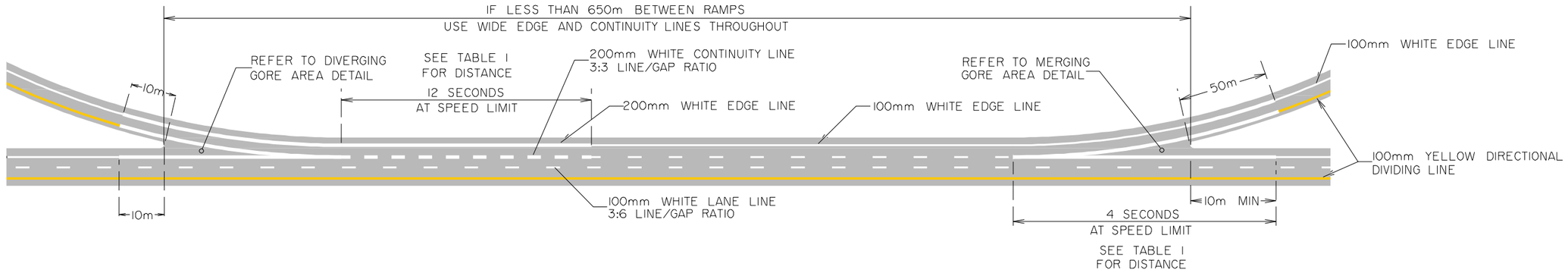
Alberta TRANSPORTATION

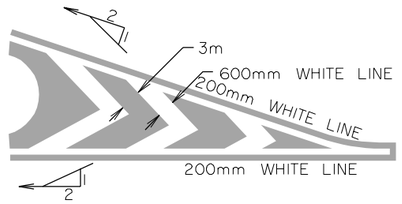
FIGURE
TCS-C-620

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERCHANGE ON-RAMP
(SINGLE LANE)
ACCELERATION LANE

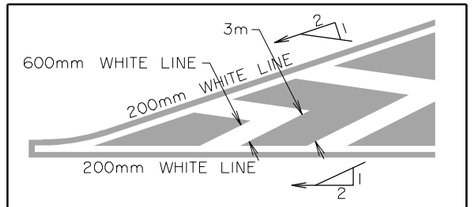
Prepared By: R.M.	Checked By: S.M.	Scale: N.T.S.	Section C6





DIVERGING
GORE AREA MARKING
(OPTIONAL)

TABLE I		
SPEED LIMIT km/h	DISTANCE TRAVELLED IN 4 SECONDS metres	DISTANCE TRAVELLED IN 12 SECONDS metres
110	120	370
100	110	335
90	100	300
80	90	270
70	75	235
60	65	200
50	55	170



MERGING
GORE AREA MARKING
(OPTIONAL)

NOTES:

EACH SITUATION WILL REQUIRE ASSESSMENT AND JUDGEMENT BY THE ENGINEER

DISTANCES AND DIMENSIONS MAY HAVE TO BE ADJUSTED ACCORDING TO INDIVIDUAL CIRCUMSTANCES.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-6.06	B.B.	Mar/03

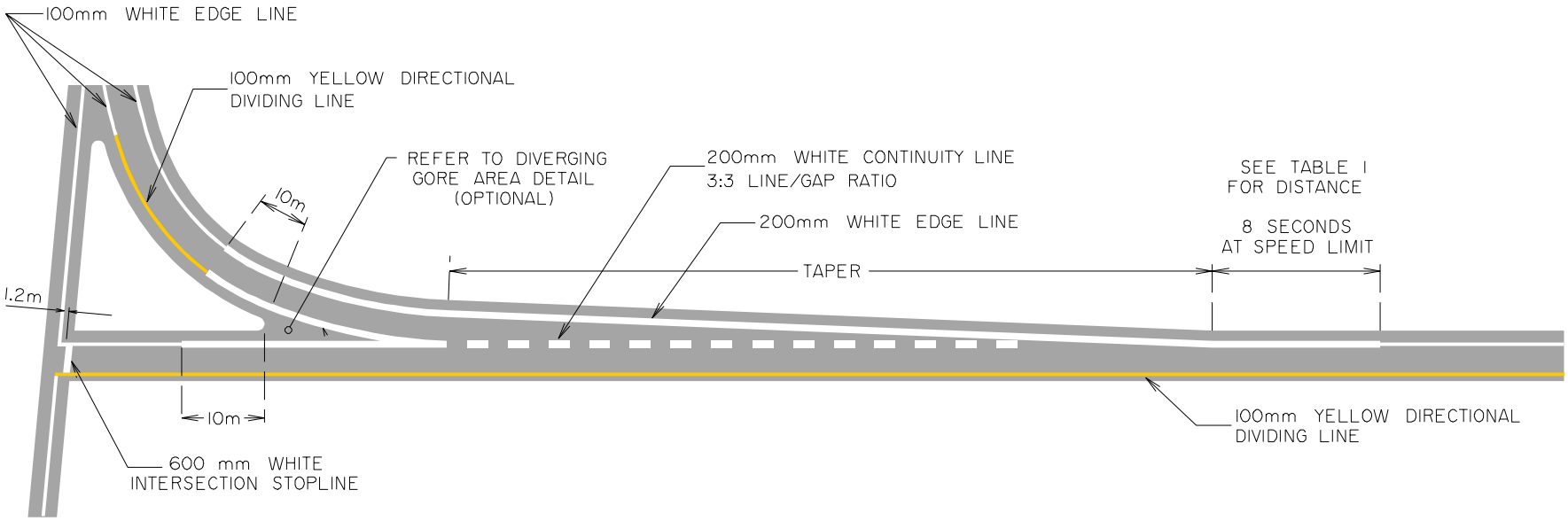
Alberta
TRANSPORTATION

FIGURE
TCS-C-625

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
INTERCHANGE
WEAVING LANES

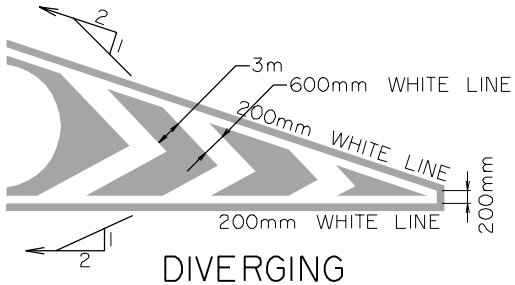
Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C6



NOTES:

EACH SITUATION WILL REQUIRE ASSESSMENT AND JUDGEMENT BY THE ENGINEER

DISTANCES AND DIMENSIONS MAY HAVE TO BE ADJUSTED ACCORDING TO INDIVIDUAL CIRCUMSTANCES.



DIVERGING GORE AREA MARKING (OPTIONAL)

TABLE I	
SPEED LIMIT km/h	DISTANCE metres
110	245
100	220
90	200
80	180
70	155
60	135
50	110

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-6.07	B.B.	Mar/03

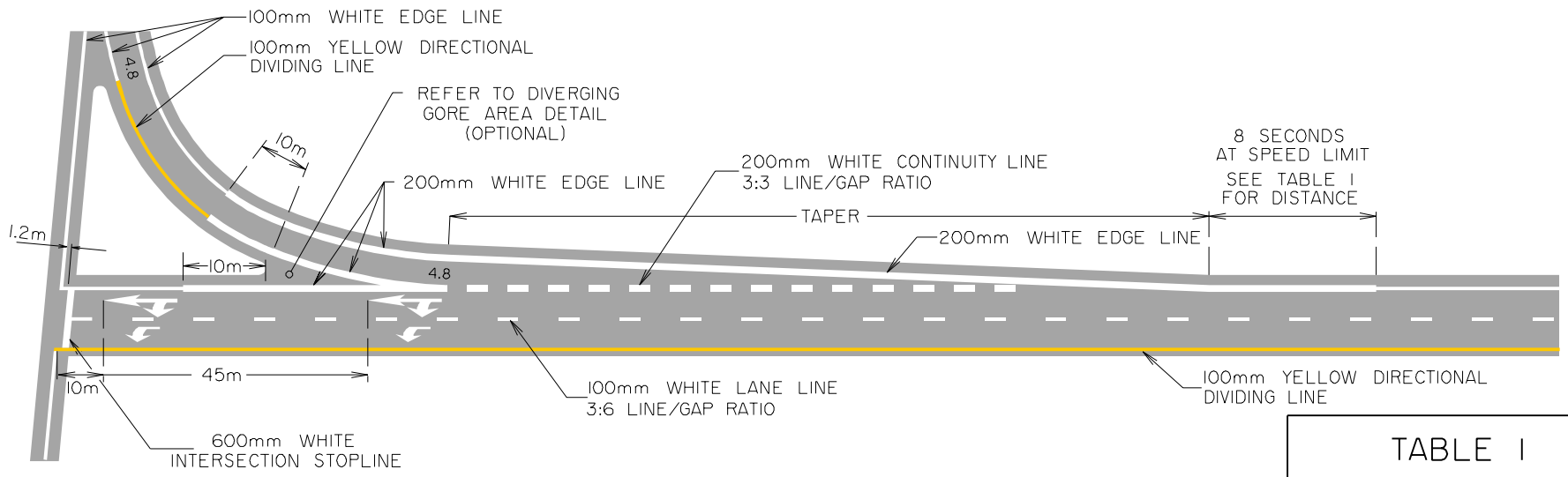
Alberta TRANSPORTATION

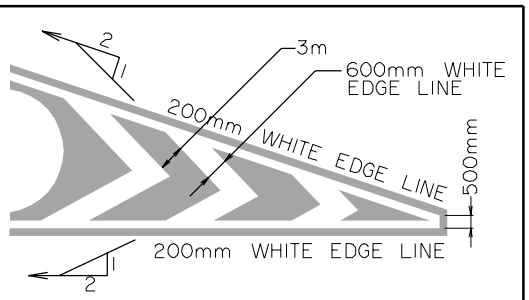
FIGURE TCS-C-630

Date: MAY 1999

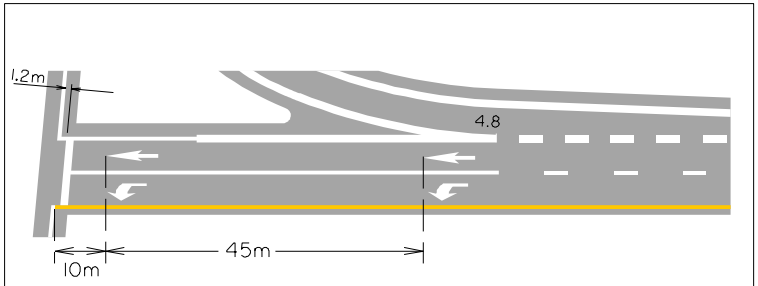
TYPICAL PAVEMENT MARKINGS
SINGLE LANE INTERCHANGE EXIT TERMINALS

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C6





DIVERGING
GORE AREA MARKING
(OPTIONAL)



NOTE:

IN SITUATIONS WHERE LEFT TURNS ARE ALLOWED ONLY FROM THE LEFT HAND LANE, THIS PAINTING SCHEME MUST BE USED.

NOTES:

EACH SITUATION WILL REQUIRE ASSESSMENT AND JUDGEMENT BY THE ENGINEER

DISTANCES AND DIMENSIONS MAY HAVE TO BE ADJUSTED ACCORDING TO INDIVIDUAL CIRCUMSTANCES.

TABLE 1

SPEED LIMIT km/h	DISTANCE metres
110	245
100	220
90	200
80	180
70	155
60	135
50	110

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-6.08	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE
TCS-C-635

Date: MAY 1999

TYPICAL PAVEMENT MARKINGS
TWO LANE
INTERCHANGE EXIT TERMINALS

Prepared By: P.G.	Checked By: S.J.M.	Scale: N.T.S.	Section C6

C7 Delineators

Delineators are intended to indicate the alignment of the roadway and act as a guide for the motorist. They are not intended to be used as warning devices. Road edge delineators (guide posts) should be installed as required to provide clear and simple guidance and in accordance with the warrants and plans contained in this section. The guidelines and practices for provision of delineation have evolved over the years.

C7.1 Implementation

After new guidelines/practices are adopted, it is desirable to use a consistent approach to implementation on various types of projects, e.g., construction, maintenance, etc. The following approach is recommended:

C7.1.1 New Construction Projects

Use new practice on all new construction projects. The new practice involves installation of delineation at the new construction stage for single residential accesses where these guide-posts would only be replaced by the landowner. Landowners should be made aware of this policy at the time of land negotiations where applicable. If there is no land transaction taking place, landowners would be advised of the new policy only where they request replacement of delineators.

C7.1.2 Rehabilitation Projects

On existing roadways, replacement of delineators which are damaged or knocked down should be undertaken as per the new practice. Where there are segments of highways or selected locations that are currently delineated but clearly do not require delineation according to the new practice, the delineation may be removed following a review by an engineer responsible for this work (generally the Alberta Transportation Operations Manager for the area). Such a review should consider the benefits of removal of delineation versus the risks that may result from such action. Where major changes (particularly deletions) to delineation are to take place, the use of temporary signing to advise motorists of the change is suggested.

C7.2 Delineator Warrants

Delineators shall be of sufficient size, mounted on suitable supports at the heights as indicated on Figure TCS-C-701. The colour of the delineator reflector strip used shall be white except at concealed intersections, such as those along a curve, where green reflector strip are to be used (see Section C 7.2.6). Delineators should be used to indicate: changes in roadway alignment, roadway width transitions, roadside hazards and locations of intersections or approaches.

C7.2.1 Offsets

The delineators are to be located approximately 0.6 m from the edge of the road as shown on Figure TCS-C-701 in this section.

C7.2.2 Horizontal Curves

Horizontal curve delineation is normally required only on the outside of curves. See spacing chart below for placement. For delineator spacing refer to Figure TCS-C-701.

RADIUS OF CURVE (m)	SPACING ON CURVE (m)	ONE POST IN ADVANCE & BEYOND CURVE	
		ADVANCE SPACE (m)	BEYOND SPACE (m)
Over 1500	Nil	-	-
1500	60	60	90
1200	60	60	90
1000	60	60	90
900	60	60	90
800	60	60	90
700	60	60	90
600	55	55	90
450	45	45	90
350	35	35	75
300	30	30	60
250	25	25	55
220	22	22	50
200	20	20	45
180	18	18	35

C7.2.3 Transitions

The recommended spacing on transition tapers (i.e., four-lanes to two-lanes) is 30 m.

C7.2.4 Tangents

Delineators are not usually required on tangent sections of roadway. Should they be required due to some feature of the road other than those situations described in this section they should be installed at 60 m intervals. Where guardrail has been installed and the ends are buried in the sideslope, only one (1) delineator is required to mark the end of the guardrail. Where the guardrail has been buried near the edge of the pavement, three (3) delineators are necessary. The delineator post located farthest away from the guardrail is optional for lower volume roads, e.g., divided highways with an AADT <8,000, or undivided highways with an AADT <2,000. See Figure TCS-C-720.

C7.2.5 Delineation for Turning Movements

- On tangent sections of acceleration and deceleration ramps, delineators should be installed at 30 m intervals as shown on Figure TCS-C-715.
- Curved sections of ramps should be delineated as in Section C7.2.2, delineator warrants.
- Exit gores require different treatment on the through route than on the off-ramp. On the through route there should be three (3) delineators at 6 m spacing followed by one at 9 m. On the off-ramp side of the gore there should be three (3) delineators at 3 m spacing followed by one (1) at 6 m and one (1) at 9 m as shown on drawing Figure TCS-C-715.
- Crossovers should have a delineator installed in each of the bullet noses on the median if the AADT for the intersecting road is greater than 1,000, as shown on drawing TCS-C-701. If the AADT for the intersecting road is less than 1,000, delineators are not required at the bullet noses on the median.
- Public approaches should be delineated with one (1) guide post on the shoulder of the highway and one (1) on the shoulder of the intersecting roadway, as shown on Figures

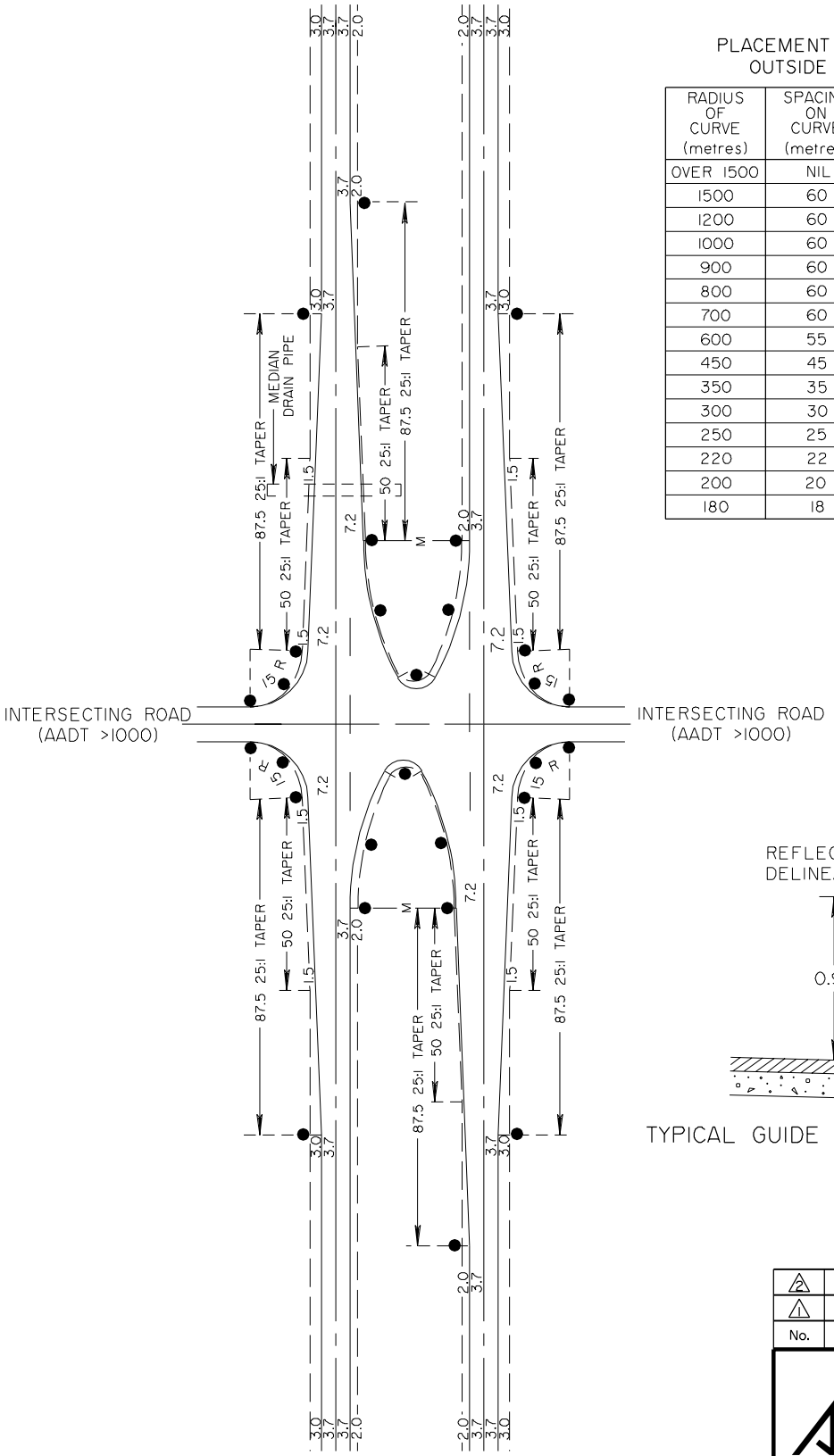
TCS-C-705, TCS-C-705.1, TCS-C-710 and TCS-C-710.1 for normal application. For low volume application, one (1) guide post on each side of the intersecting roadway is sufficient.

- Single residential approaches may be marked by one (1) delineator on each side of the approach, as shown on Figures TCS-C-705, TCS-C-705.1, and TCS-C-710.1. Alberta Transportation shall install guide posts at the time of initial construction, but will not be responsible for subsequent replacement.
- Field approaches do not normally require delineation.

C7.2.6 Green Reflectors

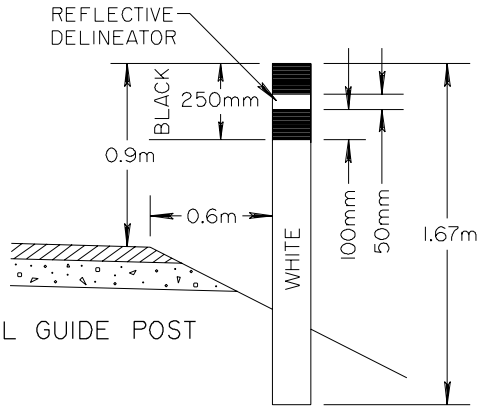
Concealed access points (including public accesses) may be marked by the use of green reflectors located on each side of the approach. The necessity for these markers will be accentuated if the approach is in an area that has been delineated for reasons other than the approach, e.g., due to a horizontal curve.

DELINEATION TREATMENT FOR FOUR LANE DIVIDED HIGHWAY INTERSECTION (AADT >1000)



PLACEMENT OF GUIDE POSTS ON OUTSIDE OF CURVES ONLY

RADIUS OF CURVE (metres)	SPACING ON CURVE (metres)	ONE POST IN ADVANCE & BEYOND CURVE	
		ADVANCE SPACE (m)	BEYOND SPACE (m)
OVER 1500	NIL	-	-
1500	60	60	90
1200	60	60	90
1000	60	60	90
900	60	60	90
800	60	60	90
700	60	60	90
600	55	55	90
450	45	45	90
350	35	35	75
300	30	30	60
250	25	25	55
220	22	22	50
200	20	20	45
180	18	18	35



TYPICAL GUIDE POST

LEGEND:

● DELINEATOR GUIDEPOST

NOTES:

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-7.01	B.B.	Mar/03

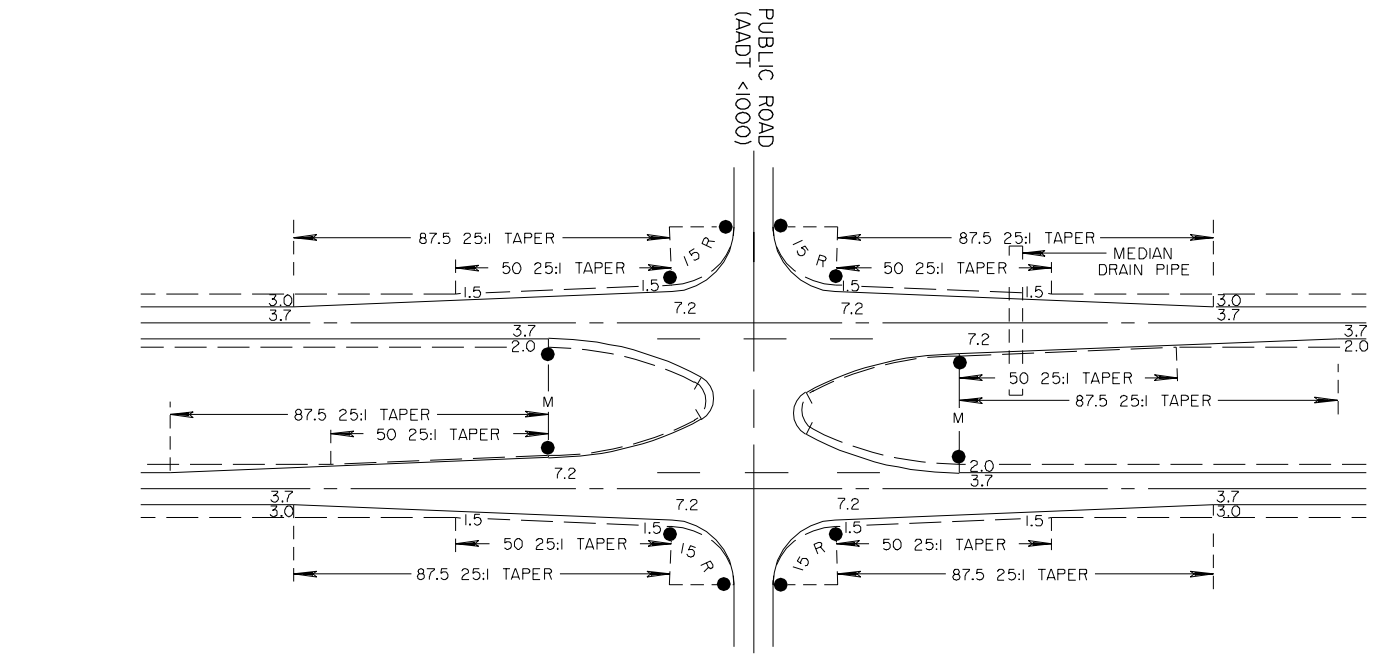
Alberta TRANSPORTATION

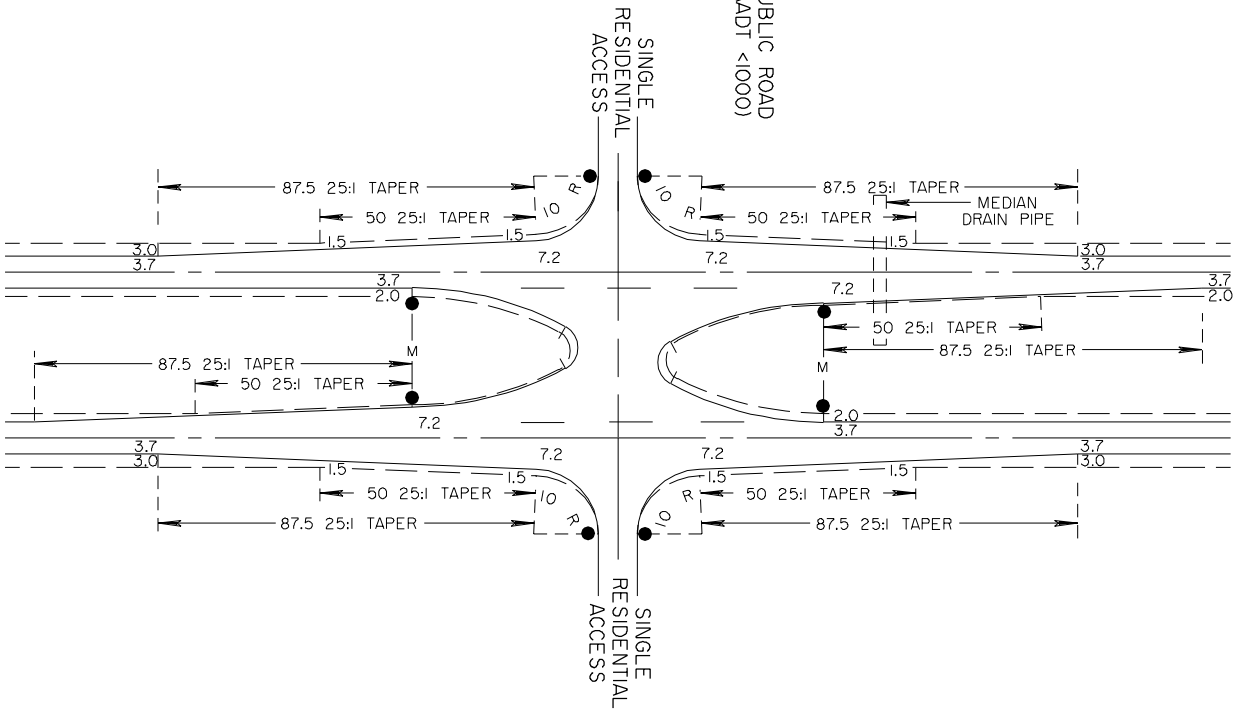
FIGURE TCS-C-701

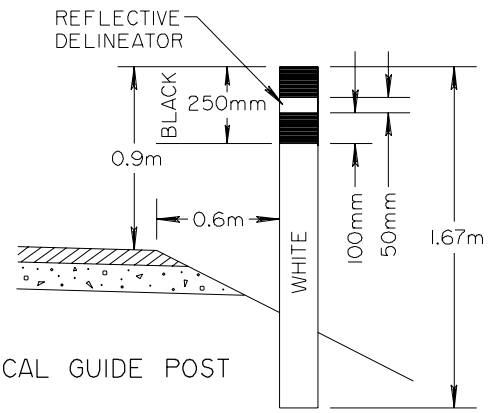
Date: MAY 1999

DELINEATION FOR DIVIDED HIGHWAY INTERSECTION (AADT>1000)

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C7







TYPICAL GUIDE POST

LEGEND:

● DELINEATOR GUIDEPOST

NOTES:

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-7.02	B.B.	Mar/03

Alberta TRANSPORTATION

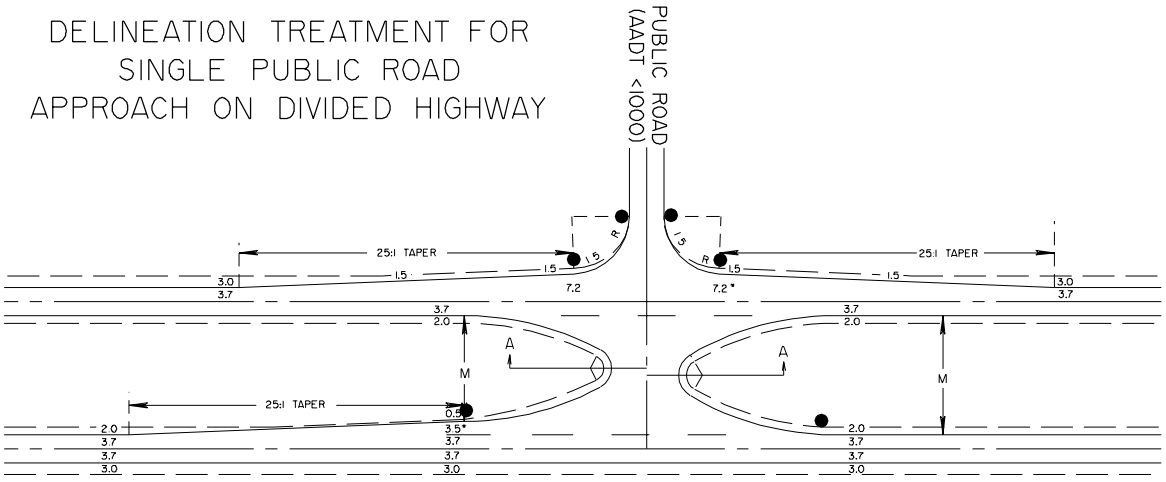
FIGURE
TCS-C-705

Date: MAY 1999

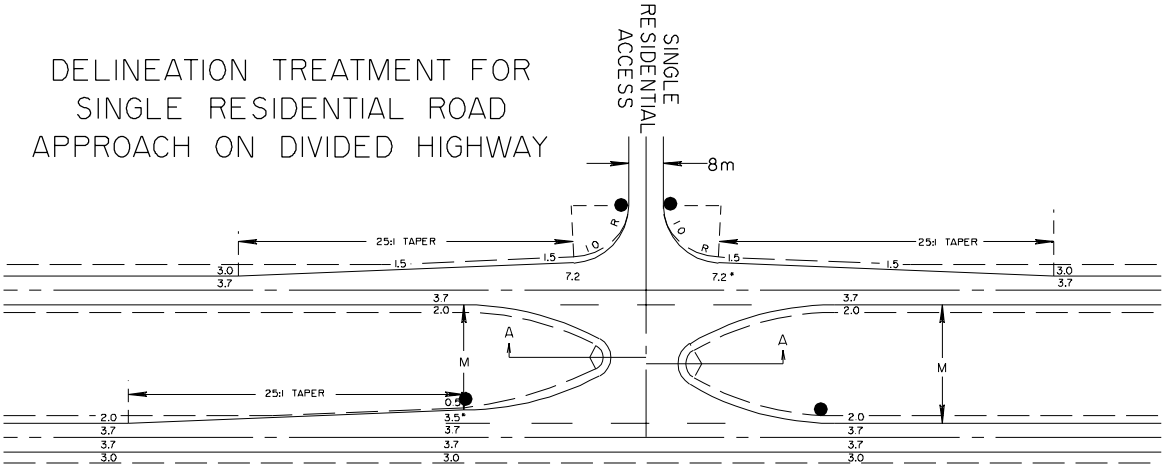
GUIDE POST DELINEATION
FOR PUBLIC AND RESIDENTIAL
APPROACHES ON DIVIDED HIGHWAY

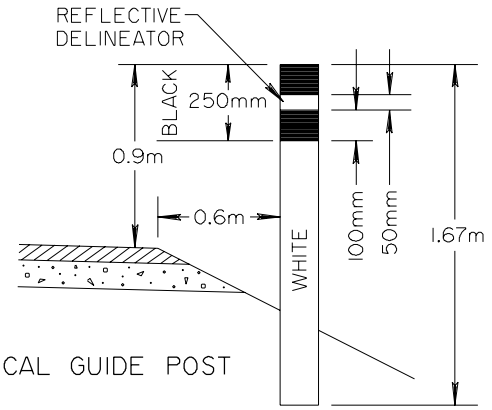
Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C7

DELINEATION TREATMENT FOR SINGLE PUBLIC ROAD APPROACH ON DIVIDED HIGHWAY



DELINEATION TREATMENT FOR SINGLE RESIDENTIAL ROAD APPROACH ON DIVIDED HIGHWAY





TYPICAL GUIDE POST

LEGEND:

● DELINEATOR GUIDEPOST

NOTES:

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-7.03	B.B.	Mar/03

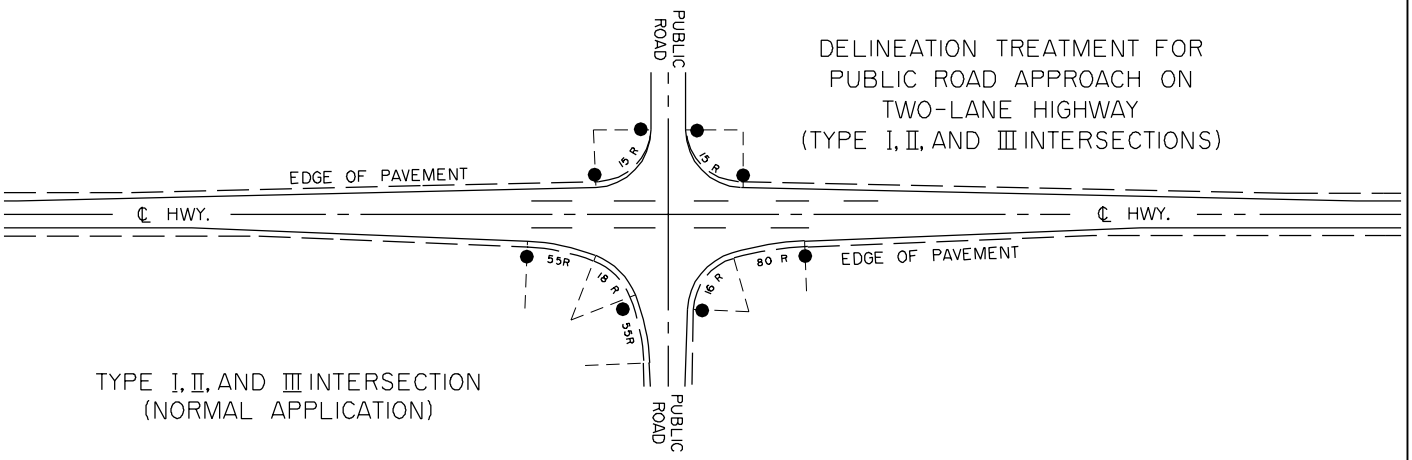
Alberta TRANSPORTATION

FIGURE TCS-C-705.1

Date: MAY 1999

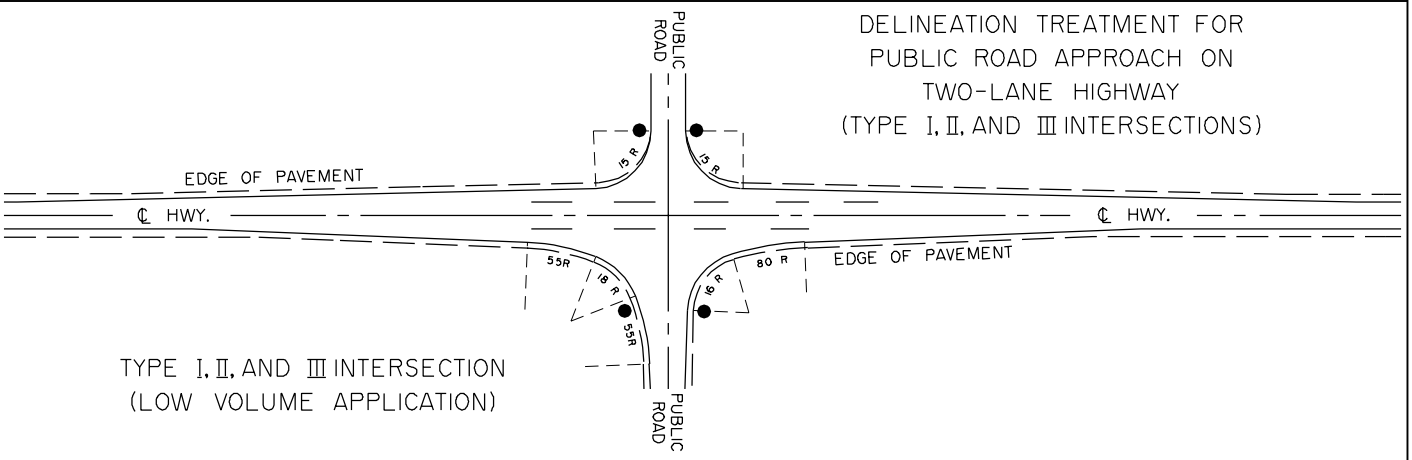
GUIDE POST DELINEATION FOR PUBLIC AND RESIDENTIAL APPROCHES ON DIVIDED HIGHWAY AT T-INTERSECTION

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C7



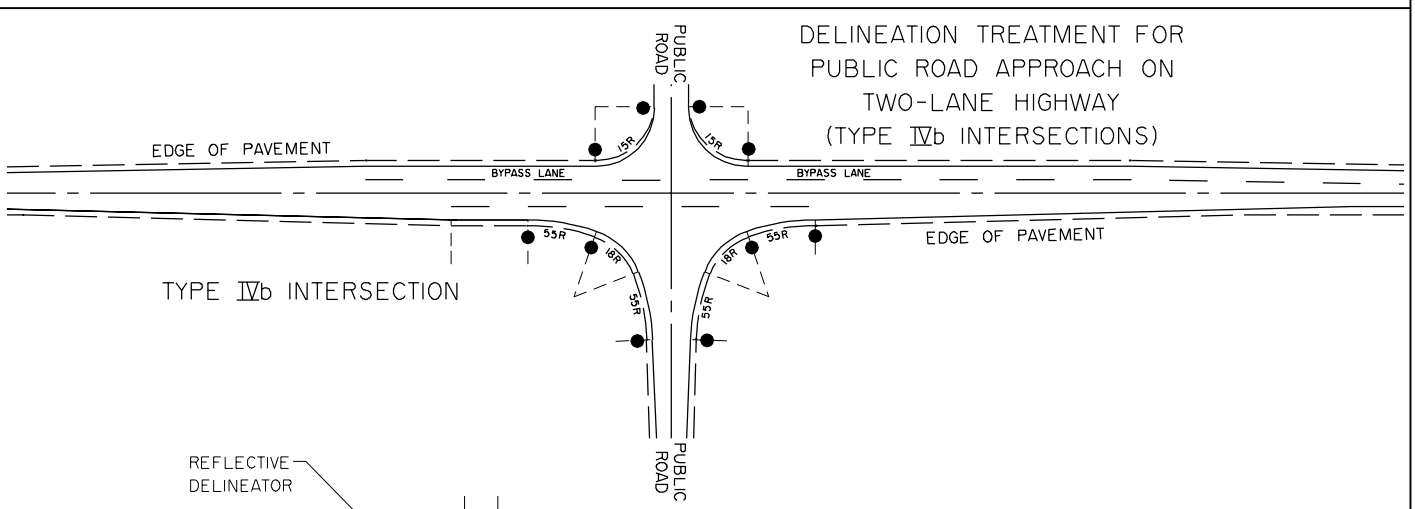
DELINEATION TREATMENT FOR PUBLIC ROAD APPROACH ON TWO-LANE HIGHWAY (TYPE I, II, AND III INTERSECTIONS)

TYPE I, II, AND III INTERSECTION (NORMAL APPLICATION)



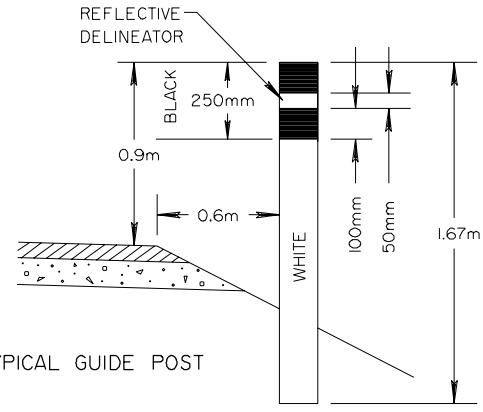
DELINEATION TREATMENT FOR PUBLIC ROAD APPROACH ON TWO-LANE HIGHWAY (TYPE I, II, AND III INTERSECTIONS)

TYPE I, II, AND III INTERSECTION (LOW VOLUME APPLICATION)



DELINEATION TREATMENT FOR PUBLIC ROAD APPROACH ON TWO-LANE HIGHWAY (TYPE IVb INTERSECTIONS)

TYPE IVb INTERSECTION



TYPICAL GUIDE POST

LEGEND:

● DELINEATOR GUIDEPOST

NOTES:

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-7.04	B.B.	Mar/03

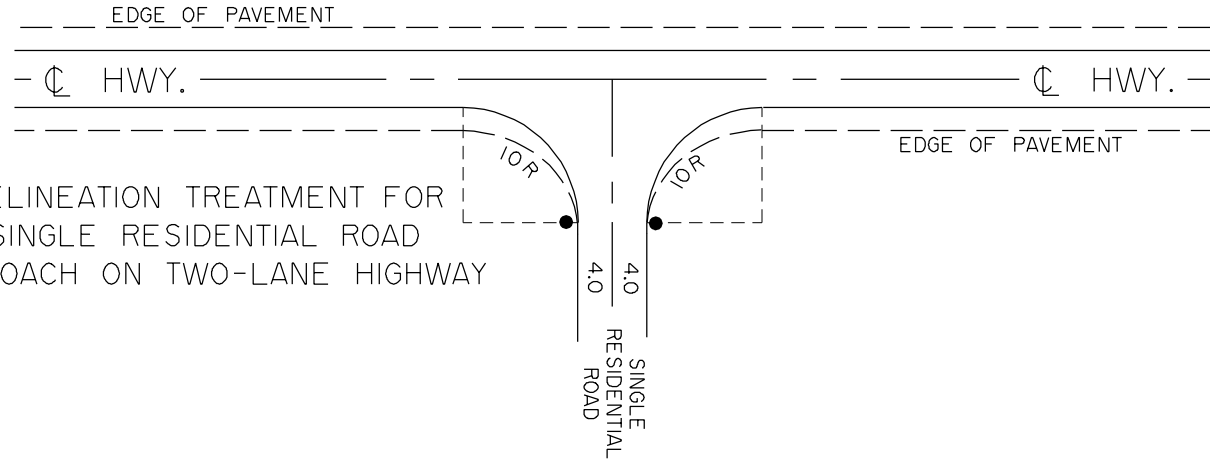
Alberta TRANSPORTATION

FIGURE TCS-C-710

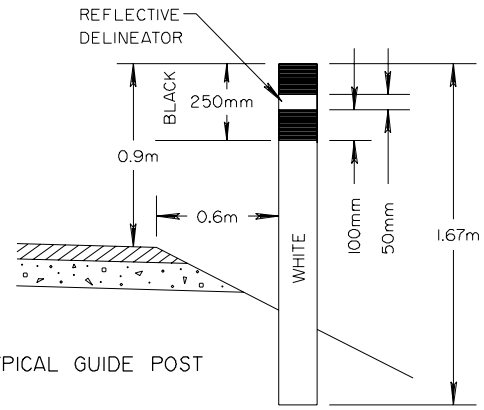
Date: MAY 1999

GUIDE POST DELINEATION FOR PUBLIC APPROACHES ON UNDIVIDED HIGHWAY

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C7



DELINEATION TREATMENT FOR SINGLE RESIDENTIAL ROAD APPROACH ON TWO-LANE HIGHWAY



TYPICAL GUIDE POST

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-7.05	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE TCS-C-710.1

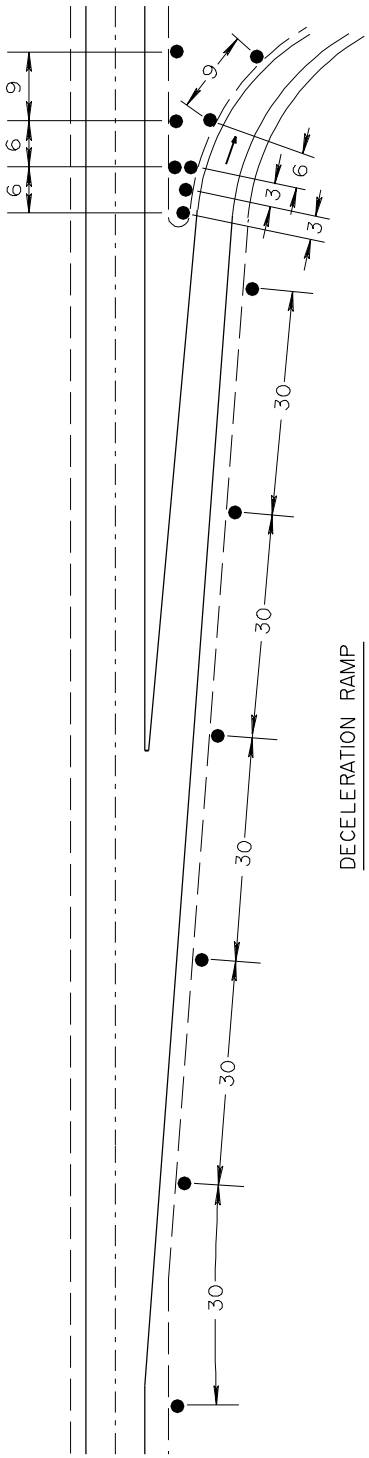
Date: MAY 1999

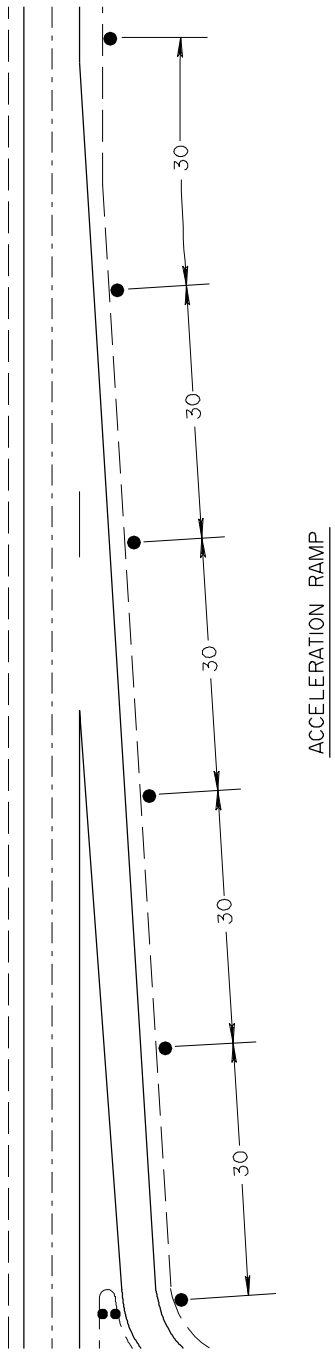
GUIDE POST DELINEATION FOR RESIDENTIAL APPROACHES ON UNDIVIDED HIGHWAYS

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C7

LEGEND:
● DELINEATOR GUIDEPOST

NOTES:
ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.





No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-7.06	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE
TCS-C-715

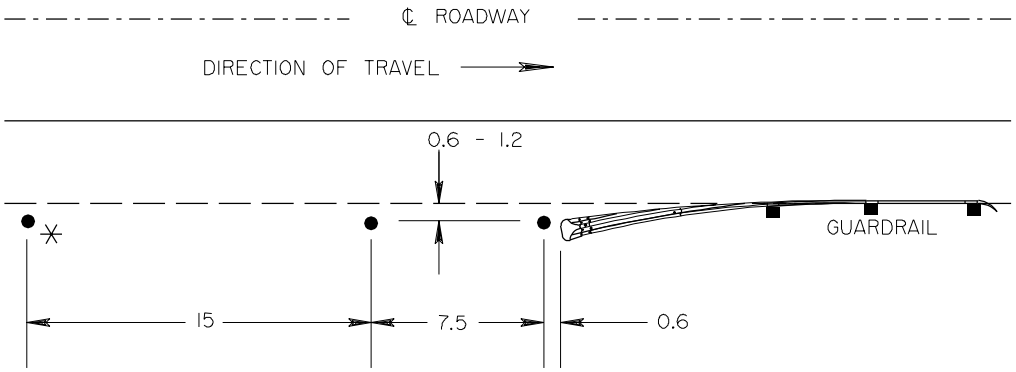
Date: MAY 1999

GUIDE POST DELINEATION FOR RAMPS

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C7

● LEGEND: DELINEATOR GUIDEPOST

NOTES:
ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.



ADJACENT TO END TREATMENT

LEGEND:

● DELINEATOR GUIDEPOST

NOTES:

✳ THIS DELINEATOR POST IS OPTIONAL FOR LOWER VOLUME ROADS, eg. DIVIDED HIGHWAYS WITH AADT < 8000, OR UNDIVIDED HIGHWAYS WITH AADT < 2000.

NOTES:

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.

No.	DESCRIPTION	BY	DATE
2			
1	Dwg. no. changed from TCS-C-7.07	B.B.	Mar/03

Alberta TRANSPORTATION

FIGURE TCS-C-720

Date: MAY 1999

GUIDE POST DELINEATION FOR GUARDRAIL

Prepared By: R.M.	Checked By: S.J.M.	Scale: N.T.S.	Section C7