"The Sign of a Professional"

ROAD DESIGN SPECIFICATIONS FOR OVERSIZE LOADS

VERSION 9

NEW ZEALAND HEAVY HAULAGE ASSOCIATION

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Contents

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1 Introduction

The vast majority of loads transported on New Zealand roads can be transported within the normal maximum dimensions. There is however a significant number of loads that exceed these dimensions, and by their very nature cannot be transported with reduced size, which are know as oversize loads.

The transport of oversize freight (comprising overdimension and overweight loads) most often means that these will impact on the normal operation of the roading network, and the NZ Transport Agency impose conditions on the travel to ensure safety for all road users, and these are contained in the Vehicle Dimensions and Mass Rule (41001).

There are also some factors that designers of roading infrastructure can take into account that makes the transport of oversize loads safer and easier to undertake. The specifications that are listed in the document are designed to act as a guideline for Road Controlling Authorities (RCA's) to ensure that these loads can be transported across its roading network.

This 9th version of the Specifications includes a concession in the overall dimensiosn that we seek on overdimension routes. This is to provie better alignmet between the envelope required to transport overdimension loads, and that able to be provided by the NZ Transport Agency Waka Kotahi on State Highways.

1.1 Aims

The aim of these specifications is to:

1. Ensure that loads are physically able to fit on the road within the range of infrastructure that are commonly found on roads in New Zealand; and
2. Encourage RCA's to design roads and structures so that safety is maintained whilst the load is negotiating the road and any structures that may be built into or on the road.
3. Ensure that the roading network - including roadsides – are maintained to provide ongoing provision for the transport of oversize freight.

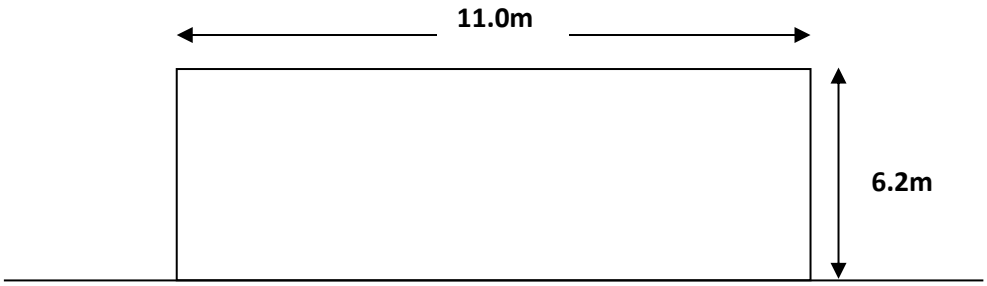
1.2 Application of this Document

The specifications are intended for all new roads being developed along with roading changes or modifications. The specifications are intended as guidelines for RCA's to apply to specific situations. In some cases it is accepted that it will not be possible to meet all the requirements. In such situations, RCA's are strongly encouraged to consult with the Association and local heavy haulage/overdimension operators to discuss alternative design configurations.

2 General Dimension Requirements

2.1 Width and Height Requirements

Minimum Overall width	11.0 metres
Minimum Height from pavement surface	6.2 metres



Note that these dimensions do not include a clearance envelope that permits the safe passage of a load with sufficient tolerance to clear any obstructions.

Based on normal overdimension load travel patterns in New Zealand, these dimensions allow for 97% of wide loads and high loads to travel unimpeded.

These dimensions are similar (but not the same) as those specified by the NZ Transport Agency, however the above dimensions are based on actual permit information relating to the demand for travel for wide and high loads.

2.2 Special Routes Height Requirements

There are some special routes where extra height clearance should be provided by Road Controlling Authorities.

These are for the purpose of accessing specific destinations, or for the purpose of transporting special goods from the site of manufacture to their delivery point.

Examples of these situations include the following:

- Delivery of boats or yachts from their construction centre to their destination, for example a local marina
- Large goods bound for export where access to the local port is required

In these situations liaison with the NZ Heavy Haulage Association or with local carriers should identify what these routes are. Typically in these situations, a height clearance of 8 metres should be sufficient for most large abnormal oversize loads.

2.3 Design and Check Vehicle Guidance

Roading projects – particularly swept path requirements – are designed so that regular sized freight truck combinations can negotiate between islands, around roundabouts, and in and out of intersections without running over islands and alike.

These roading designs, need to be tested using check vehicles that are used in the oversize industry. The following vehicles are those that would travel on the State Highway network, and would frequently be on local road networks as well.

(A). Heavy Haulage Transporter
This is a tractor unit with a rows of 8 load divider and a 4 rows of eight trailer, widened out to 3.5m in width.

This is used primarily to model where the combination will track through the road design and where there may need to be special accommodations in design for mountable kerbs or run over areas. The design of this combination including the width and axle spacing are available from the Association for tracking the swept path requirements.

(B). Housemoving Transporter

This is a tractor unit towing a 4-axle semi trailer that is at 3.1m in width, and a forward distance of 18m. This needs to carry a house load simulated to be 11m in width and a length of 20m, which will include some rear overhang.

This is used primarily to model where the combination and load will track through the road design and where the location of signage, lightpoles and perhaps vegetation needs to be located so that it is out of the swept path area of the load.

The design of this combination including the width and axle spacing are available from the Association for tracking the swept path requirements.

2.4 Turning Circle Requirements

General Tracking	The Association has designs for a specialised transporter that is available on request so that the swept path of this vehicle can be modelled.
Roundabouts	The overall design of roundabouts is dependant on context. Roundabouts positioned on State Highways in rural areas have requirements different from those in urban area.

Design requirements for a State Highway one-lane roundabout are as follows:

1. **Roundabout Pavement width** – would prefer minimum 6.5m pavement width (but depends on diameter of roundabout – prefer 45m diameter for Rural State Highway location)

2. **Roundabout apron** – a fully mountable apron around the inside of the roundabout which is 1.5m wide with a maximum 50mm upstand to enable large transporters to mount the apron is preferred. An alternative design could see a mountable kerb leading to a drivable apron. See section 3.2 below for details of both options.

3. **Location of light poles** – if there are light poles located around the roundabout, then they need to be located at least 1.5m behind the kerb. In addition any light poles on the approaches need to be at least 7.5m from any centre road median islands (half of any wide load will hang over the median island).

4. **Chevron signage** - inside the roundabout needs to be either in the centre of the roundabout (and at least 2.0 m away from the inside edge of the apron) or be no higher than 1m in height above the road surface.

5. **Signage on the approaches** to a roundabout:

    a. Any large green directional signs adjacent to a median island needs to be at least 7.5m away from the edge of the median island

    b. Any "Give way" signs at the intersection or on the median islands need to be removable (in sockets).

    c. Any low green directional signage on the islands needs to be a maximum of 1.0m above the road surface

6. **The pavement width** on the approaches to the intersection adjacent to the median islands needs to be 5.0m in width.

Good Example of a Roundabout suitable for an overdimension and overweight route at SH27/26:

Photo 1

Design requirements for an urban one-lane roundabout on an overdimension route:

Generally the space available for a roundabout in an urban area is restricted.

It is recommended that designers of roundabouts in these situations contact the Association to work through the specific details about how overdimension (or and overweight) transporters can be accommodated through the roundabout.

Factors to be taken into account, include:

1. Which directions that overdimension and overweight loads travel to and from on the legs of the roundabout
2. The mountability of the apron around the roundabout, or sometimes the whole centre of the roundabout
3. The location of signage and lightpoles and how they may restrict wide loads travelling through the area
4. Pavement width on the approaches and the circulating lane around the roundabout.
5. The design of any islands on the approaches.

3 New Works Specifications

3.1 Requirements for Mountable Road Structures

Specifications for kerbs at: • roundabouts • traffic islands • pedestrian refuges	100mm height (maximum) Greater than 100mm height not preferred as causes damage to tyres, wheels and kerbs All islands, roundabouts to be made mountable. Gradual angle as per photo 1. Prefer a slope of 33 degrees Gentle collar on roundabouts where possible (see photo 2)

Photo 2

Note: Overall height of kerbing on traffic islands is lower to ease driving over islands if necessary – easier on concrete kerbing and tyres

Proper mountable kerbs on roundabout to ease mountability (less than 45 degrees)

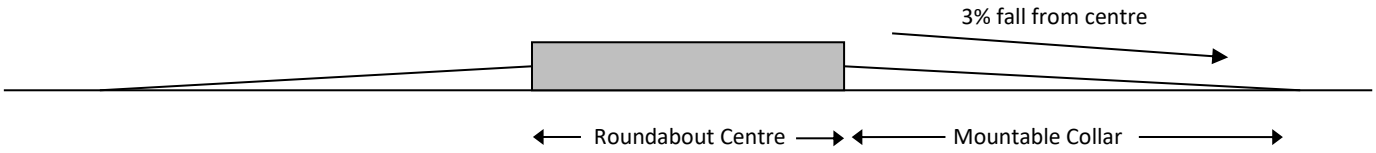
A minimum of planting in centre of roundabout to enable visibility across the roundabout to control traffic safely.

3.2 Special Requirements for Roundabouts with Mountable Collars

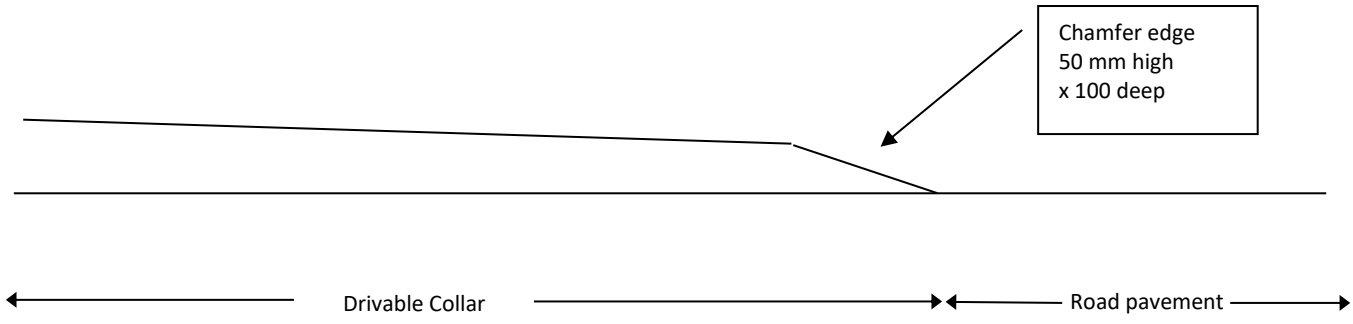
A common design feature with roundabouts installed in urban areas is for the roundabout to have a mountable collar, which heavy vehicles need to mount in order to proceed past the roundabout.

These can be suitable for overdimension loads, however the following specifications should be adhered to.

Specifications for roundabouts with mountable collars	Mountable collar should be as wide as possible so that the at least half the width of the truck and trailer can travel over the collar section The fall across the mountable collar should be no more than 3% The edge of the collar to the road should either be flat or should have a chamfer edge of no more than 50mm in height to 100 mm depth



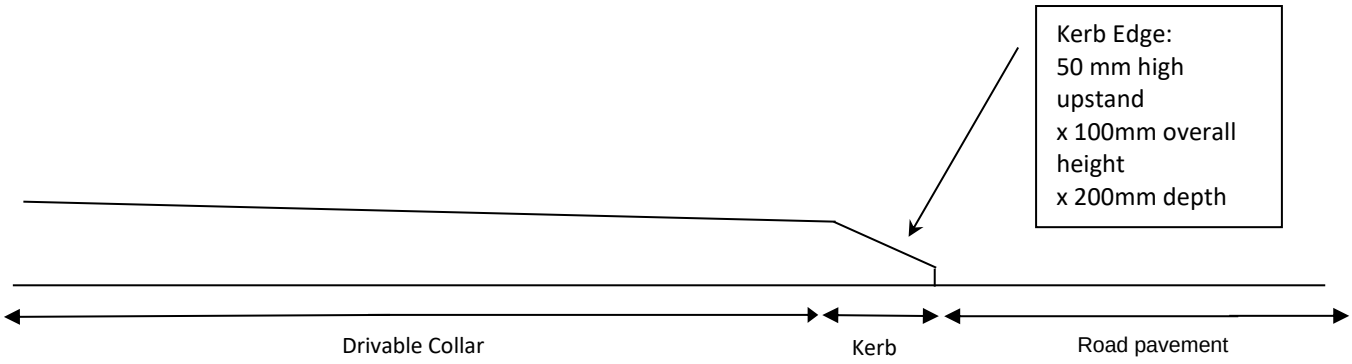
Cross section of roundabout with mountable collar



Roundabout with mountable collar detail

Alternative Design for Roundabout Collars

An alternative design for roundabouts installed on state highways areas is for the roundabout to have a mountable kerb around a driveable collar. This will mean that heavy vehicles can mount the kerb to access the collar, and will prevent light vehicles from driving over the apron at speed.



3.3 Requirements for Traffic Islands

All Traffic Islands	No shrubs or plantings in the middle. Hard fill or grass only To be built in solid concrete unless there is a maximum clearance for a wide load – i.e. truck will not have to mount island. Consult the Heavy Haulage Association if planting to see if mounting of islands is required in am specific location See photo 3 for good example – but would prefer signs in sockets.

Photo 3

Note: Height of kerbing on traffic island eases driving over islands if necessary

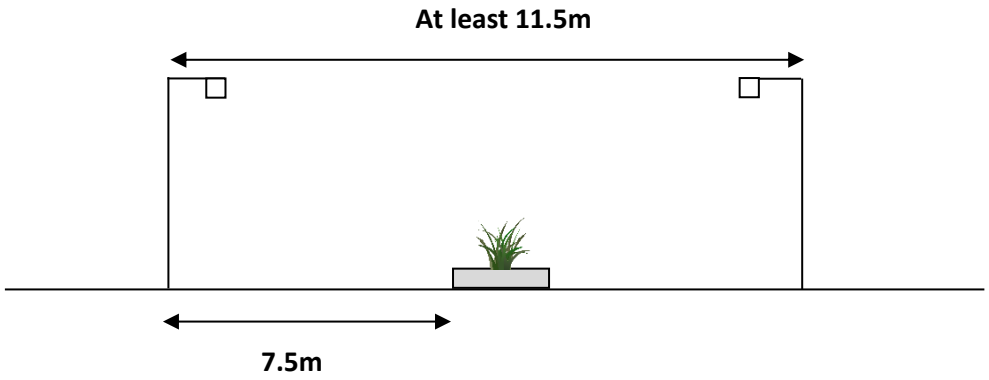
Kerbing is easily mountable

No planting - concrete fill instead

See section 3.8 for requirements for signage

3.4 Clearance Requirements for Traffic Islands & Pedestrian Islands

Pedestrian Islands in Centre of a Road or Short Median Islands – such as on the approached to roundabouts. For longer stretches of median islands use designs in section 3.6 below.	Need 11.5 m distance between hard restrictions either side of an island; and 7.5 m clearance required from one side of the island to a restriction. e.g. Traffic lights, light posts, power transformers, power poles, permanent signs and any other permanent structure. This island must still be built mountable. If there is a car parked opposite, the option to mount the island may have to be taken by an operator.



In many situations the painting of “no parking” lines for 15 metres on either side of the traffic island prevents cars being parked in awkward positions.

Pedestrian Barriers/Handrails	Not preferred. If required then must be able to be removable and pulled out by one person in case need to mount island A maximum of 1000mm high. Clearance still required as above (overall width clearances).

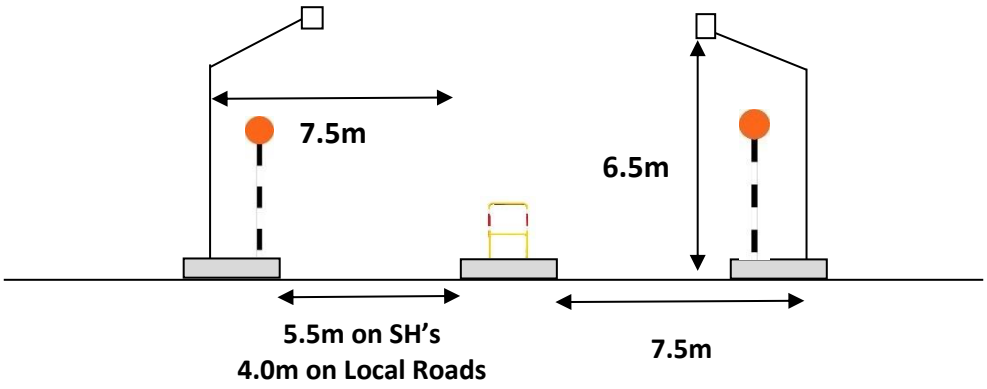
3.5 Design of Pedestrian Crossings with Refuges

Pedestrian crossings that have refuge islands in the centre of the road, with lighting and belisha signage, needs to take account of overdimension loads that travel through there.

- It is not desirable to have overdimension transporters needing to run over refuge islands. The width between the island and the edge restrictions needs to allow for loads to travel one side or the other of the islands, with 7.5 from the edge of the island to a width restriction such as a light pole.

- The Belisha beacon disc (round orange sign on top of a striped pole) needs to be positioned on the roadside edge so that the 7.5m clearance is provided. If this width is not available, then these signs are to be mounted in sockets so that they are removeable.

- Any hand rails in the centre of the islands need to be no more than 1.0m in height (preferred), or as an alternative to be in sockets so that they are removeable.



3.6 Speed Table Design

Speed Tables are for slowing down traffic, but depending on the height and approach angles, they can cause issues for the transport of oversize loads.

In order to make sure that there is sufficient ground clearance, we seek the design:

- Has a total height of 75mm above the road surface
- Has an entry gradient of 15 degrees, and the same maximum on the exit
- Takes account of any overhead infrastructure – such as traffic signals, overhead pedestrian lights or wires. Our overhead clearance to these is 6.2m

3.7 Design of Splitter Islands on Approaches to Roundabouts and Intersections

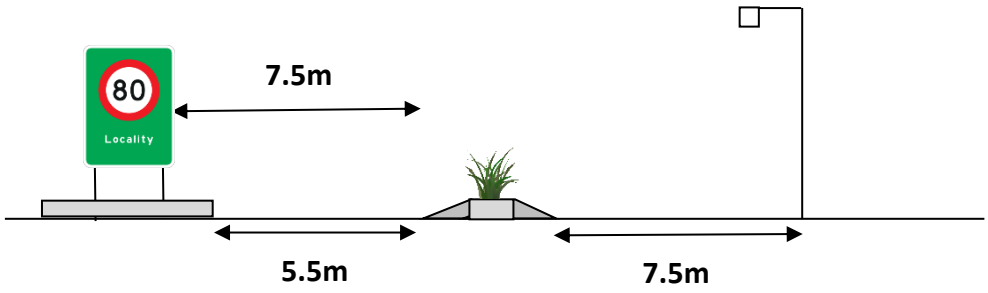
Splitter islands or medians on the approaches to roundabouts or intersections are designed to slow road traffic down and direct these vehicles to approach the intersection using a particular path.

There are certain design aspect of these and the surrounding infrastructure that need to take account of oversize loads using these roads:

- The splitter island/median acts to divide the pavement width in half, and therefore means that oversize loads need to travel one side or the other. It is not desirable to require oversize loads to mount and drive over the splitter island/median for any distance.

- Infrastructure on the sides of the road may restrict the dimensions that can be transported – such as large signs, light poles, and vegetation higher than 1 metre above the ground. In these situations, a minimum distance of 7.5m from the edge of the median island to any width restriction is acceptable for distances of up to 50m distance. Where necessary an oversize load can hang over the median into the opposing lane – where traffic will be manged by load pilots.

- If there are islands on the edge of the road adjacent to the splitter median island, then pavement width of 5.5m is to be allowed for specialised trailers that have widening width on the road of up to 4.8m.



3.8 Clearances to Roadside Electronic Signs

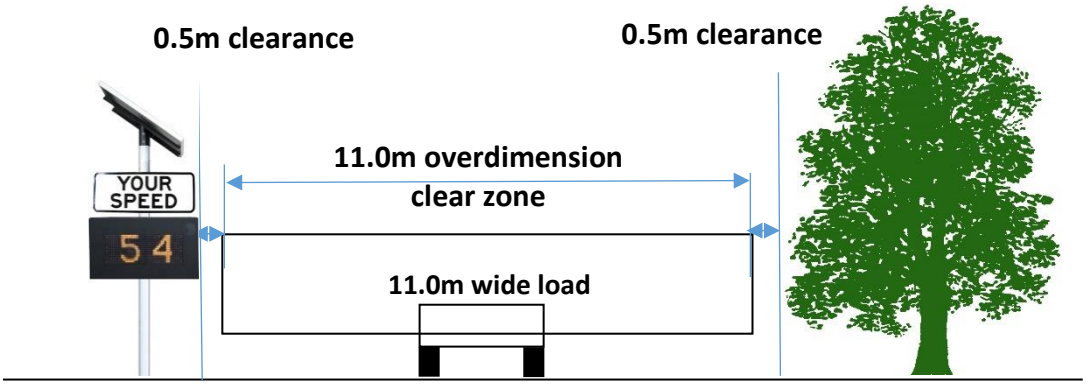
Signs that are mounted permanently at the roadside need to be located so that they are not an on-going restriction for wide loads.

Electronic signs that are fixed, including traffic information signs, and safety signs that request that drivers slow down at known accident locations need to be positioned so that they will not restrict overdimension loads from travelling past them. This is specifically in relation to other roading infrastructure or design issues.

Particular pinch points can occur where the signage is placed opposite to a width restriction on the opposite side of the road – such as a tree, a cut bank, or a large sign that cannot easily be removed. This pinch point can apply for 20m both forwards and backwards of a fixed electronic sign.

Where there is no restriction in the vicinity of the electronic sign, then the sign can still cause a pinch point if it is located too close to the side of the road, as it causes the load to travel to the right of the roadway to avoid the sign. Therefore we recommend that the sign is placed at least 2m from the edge of the pavement.

In general, the Association seeks the following requirements:



Marked Roadway
3.5m lane each side of the centreline. 1.5m shoulder each side.
Sign setback from edge of shoulder is minimum 2.0m

3.9 Positioning and Mounting of Traffic Signal Poles and Signage

We seek that any traffic signal poles and larger signs are placed outside of the normal traveling envelope for overdimension loads. Usually the only signs that regularly have to be mounted inside this are Give Way and Stop signs mounted at intersections and roundabouts.

For other signs – such as large green directional signs mounted on two posts, and traffic signal poles that are mounted on two posts – these can take some time and a number of people to safely remove and then reinstate these items.

It should only be the last resort that these larger items are placed in sockets/on hinges to enable them to be removed to allow overdimension loads through. It is preferred that these are located in places that our outside of the normal overdimension envelope.

3.10 Clearance Requirements for Wire Rope Median Barriers

- The way for a median barrier to be installed along the centreline of the road, that results in the safest outcomes is where an 11m wide load can stay on its own side of the median barrier (Option A below). This is most often possible where there are dual traffic lanes in each direction.

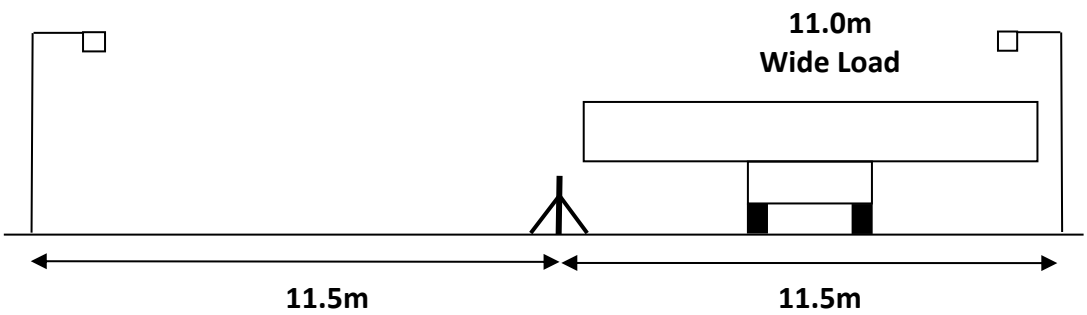
- Where there are single lanes in each direction then option B or C is possible, although option A is far preferred. Option B means that around 80% of loads (those up to 9m in width) are able to travel on their own side of the median barrier. There will be increased risks for oncoming traffic for wider loads with Option B and C below.

- There are a variety of width restrictions that will act as the width restricting barrier, these include:
    - Overhead Light poles
    - Traffic Signals Poles
    - Large signs, or signs that are concreted in the ground and not removable
    - Overhead bridge abutments
    - Banks on the side of roads
    - Roadside trees and vegetation

- Measures must be considered to remove the width restriction or change the design if neither of options A, B or C are achievable. Any design that cannot meet the criteria for A or B can be considered but they result in increased risk to on-coming traffic. In these situations, the minimum width to a roadside restriction is 7.5m. This assumes that wider loads can travel above the median barrier and hang the load over the barrier with appropriate measures in place for traffic control. Mitigations that must be considered include:

- The stretch of median barrier should be no longer than 2km in length to reduce the amount of waiting time for other traffic using the road.
- Consideration must also be given to providing pull over areas at the ends of median barriers to allow load pilots to stop on-coming traffic, and allow the wide load to come through.
- The median barrier must be less than 0.9 m high

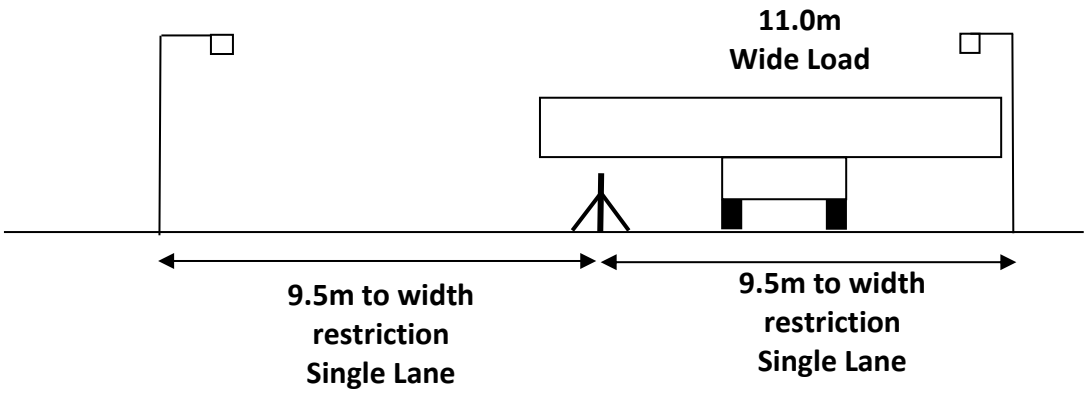
(A) Preferred Option – Results in safest outcomes for other road users.



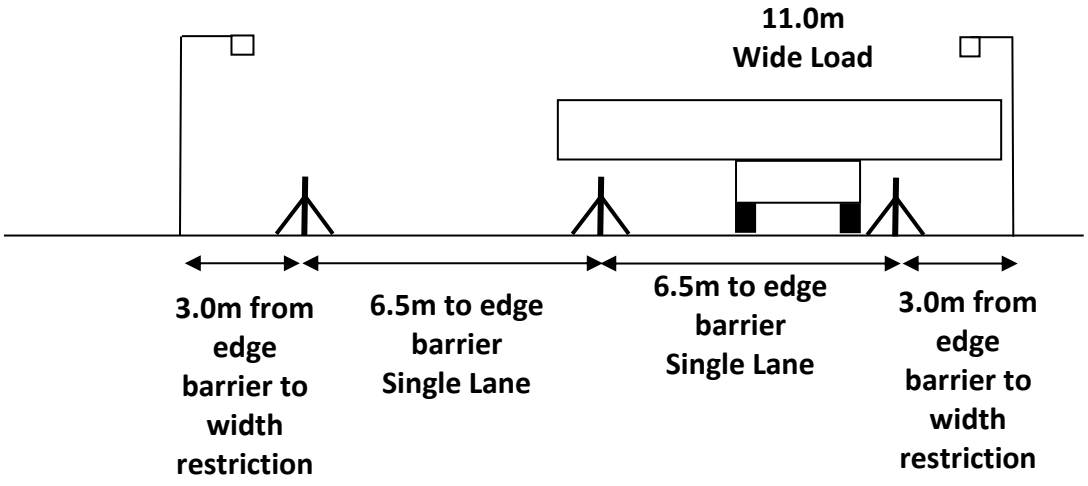
The following two scenario's are offered as a compromise when option (A) above cannot be provided.

These designs allows for the estimated 20% of oversize loads (those between 9m and 11m in width) that will need to overhang the barrier in the opposing lane, by up to 2m. This risk will need to be managed by the transport operator. It requires that all "hard restrictions" are 9.5m back from the central barrier. It is requested that there are suitable pull-off areas to park other road users at the end of each section of median barrier.

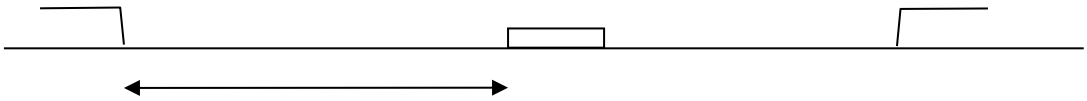
(B) When Centre Barrier only, and road is one lane in each direction, 80% of loads (those up to 9.0m wide) can travel on own side. The design must provide a 9.5m gap from the median to any roadside restriction. Note that the actual road pavement does not need to be 9.5m but must extend at least 6.5m from centre barrier.



(C) When Centre and Side Barriers, and where road is one lane in each direction, 80% of loads (those up to 9.0m wide) can travel on own side. The design must provide a 9.5m gap from the median to any roadside restriction. The roadside barrier must be 6.5m from the centre barrier.



3.11 Requirements for Pavement Width



5.5m Pavement width

- This scenario is for where a centre island median also has side islands built out from the kerb.
- The minimum pavement width of 5.5m on at least one side of the island is to allow for widening trailers to move past these islands without needing to mount the islands.
- Frequently these very wide trailers have very low ground clearance so cannot mount any centre islands.

3.12 Requirements for Traffic Signals / Signage

Overhead Traffic Signals	A minimum height of 6.5m for overhead light heads. Alternatively to be either hinged or able to be swung away to provide clearance.
Arrow Signage /Keep Left Signs	Height a maximum of 1000mm from the road surface (not from top of traffic island) Signs mounted in a sleeve, and able to be pulled out. Sleeve to be flush with the top surface. Use wedge where necessary to hold the sign into the socket (see photo 5 below) Signs that are spring loaded with flip-flop mounting is not preferred due to damage to sign and transporter.
Stop and Give Way Signs	Signs mounted in a sleeve, and able to be pulled out. Suggest to have hole drilled through the post to enable a screwdriver to slip through to remove signs that get wedged in. Sleeve to be flush with the top surface.
Other Road Furniture, Barriers	Either hinged or readily removed by one person.

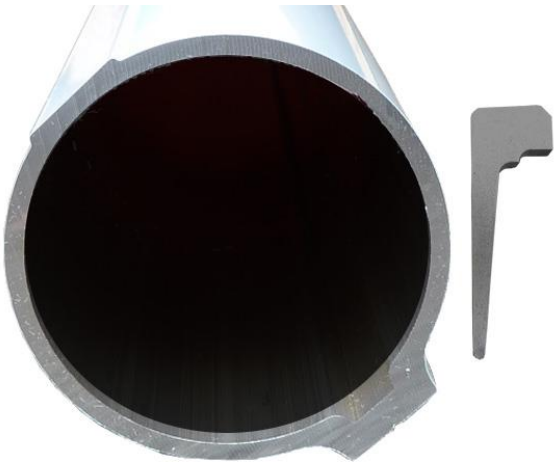


Photo 5: Sign pole with wedge

3.13 Requirements for Threshold Signs

Threshold signs have become very popular in recent years to slow traffic entering a built up area from a rural area.

These typically include large signs placed opposite each other to create a gateway effect to cause drivers to slow down as they approach the threshold area.

Consideration needs to be given to the travel of overdimension loads through the threshold sign area.

The basic requirements are:

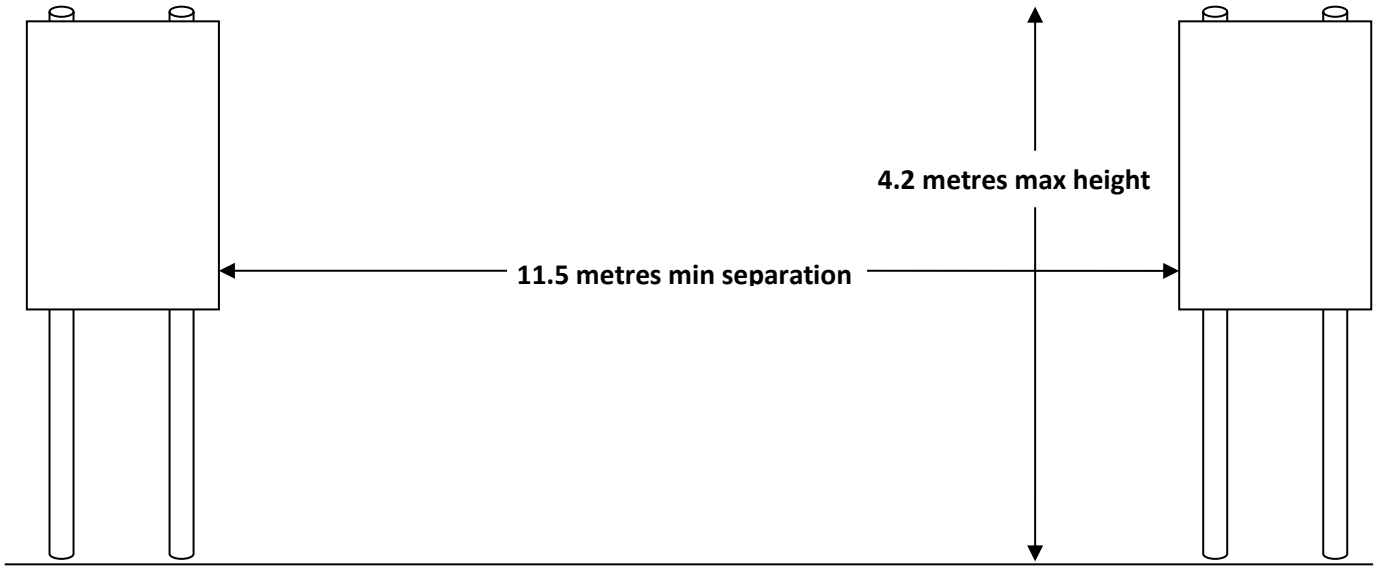
A minimum clearance of 11.5 metres between the two signs laterally across the road should be provided

The height of the threshold sign should be no more than 4.2 metres above the road surface. This allows some overdimension loads that exceed the 11.5 metre width to be lifted above the signs.

Where there is no alternative route for overdimension loads wider than 11.5 metres then the threshold signs must be made easily demountable – or have a swivel mechanism so that at least one of the signs can be rotated through 90 degrees to allow for these loads to pass through.

See figure below for preferred design for threshold signs.

Preferred Design for width gap and height of threshold signs.



3.14 Requirements for Pull-Off Areas

The installation of roadside barriers to prevent run-off by other road users, is removing those areas that oversize loads use to let following traffic that has built up past the load.

Capital project designers should identify and build into the design pull off areas that are safe for oversize loads as well as other roads to use – such as vehicles with mechanical difficulties or other large vehicles such as agricultural vehicles to pull into.

To be useful the area should be at least 7.5m in paved (or gravel) area with no width restricting items such as lightpoles. The length of the area should be at least 50m in extent.

4 Maintenance

4.1 Vegetation Maintenance

In rural areas in particular, but also in urban areas, the growth of vegetation in the following areas can reduce the available width or height to transport overdimension loads:

- Roadside Trees or bushes
- Brush growth in cuttings
- Overhanging trees that reduce available height due to drooping branches, rain, excessive leaf growth, and alike

We recommend that all vegetation be maintained so that there is a minimum of 1.5 metres of available space outside of the white line on the edge of the pavement so as to allow for overdimension loads.

In addition, a height of at least 6.5 metres should be maintained, both over the roadway and extending out to the 1.5 metres beyond the white edge line.

4.2 Mill and Pave Operations

The re-surfacing of road pavements is a continuous operation for many road controlling authorities.

The issue for overdimension loads is that if the asphalt fill is simply laid over the top of the existing road surface, then this essentially reduces the height available to overdimension loads.

Over the course of years then valuable height clearances to overhead structures, lights, power lines, overbridges and alike can effectively be reduced by a significant amount.

We recommend that on those overdimension routes where are there are overhead restrictions, that the pavement is milled out and replaced to the same height, so that available height is not lost.

5 Conclusion

These guidelines are provided to enable Road Controlling Authorities to not only meet their safety obligations but also provide for the safe movement of large permitted loads wherever possible.

However there may be specific sites where it may be difficult for whatever reason for a roading authority to meet these requirements.

In these situations, it is requested that the roading authority consult with the Association and local transport company's to negotiate the next best possible solution.

6 Contact Details

We request that Road Controlling Authorities please consult the New Zealand Heavy Haulage Association pertaining to any roading issues with regards to roundabouts, traffic islands or any new construction work that may impede the movement of overweight, overwidth and overheight loads on our roads.

New Zealand Heavy Haulage Association

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