



MINIMUM STANDARDS

Racecourse Design & Construction

In accordance with the Greyhound Racing Act 2017 No 13, section 26 (1) (a)

GREYHOUND RACING NSW

Minimum Standards Racecourse Design and Construction

Introduction

The basis for the standards for Racecourse Design and Construction have been provided in a report by The University of Technology Sydney (UTS) to Greyhound Racing NSW (GRNSW) to meet the requirements of the Racing Act 2017 No 13, Section 26(1). UTS provided a report on racecourse design and construction with a view that some or all of the contents of this report may be used by GRNSW to meet the requirements of the Racing Act.

The content of the Racecourse Design and Construction Standards is based on evidence that was available to UTS and GRNSW at the time of writing.

As more evidence becomes available the design requirements contained herein will be refined and detailed.

Reference Documents

Reference documents included the GRNSW Track Safety Standards document containing design specifications.

Document precedence

Where there is a conflict the technical information between 'existing', 'major rebuild' and 'green field' tracks and GRNSW Track Safety Standards documents, the Racecourse Design and Construction Minimum Standards shall take precedence.

Objectives

The minimum standards are designed to ensure the provision of a safe working environment for licensees and officials and safe and comfortable amenities for patrons, whilst also delivering quality facilities that provide adequate conditions for racing and adhere to animal welfare requirements.

GRNSW Assessments

A racecourse and construction audit may be conducted at any venue by GRNSW with or without prior notice to the relevant race club.

Other Statutory Requirements

It is important to note that these minimum standards do not address compliance with other additional statutory requirements regarding the facilities at each racecourse, and that it is a requirement of each registered Race Club to ensure that all safety measures are in place and operating as intended in accordance with the relevant statutory requirements. Due to the complexity of these areas of compliance each racecourse operator should take independent advice in this regard.

Minimum Standards – Racecourse Design and Construction

Existing Racecourses

For existing tracks the following design constraints are required. Existing tracks are to meet these standards within a timeframe to be specified by GRNSW.

Specifications	<ul style="list-style-type: none">• The cross-fall grade for all tracks with semi-circular bends shall be constant;• The cross-fall grade for existing tracks on all bends shall be no less than six percent (6%) taking into consideration the shape and design of the bend;• The surface grade transition into and out of the bends shall be made within the straight sections of the track;
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- The surface grade transition into the bend shall be approximately 20 m in length;
- The surface grade transition out of the bend shall be approximately 10 m in length;
- An track irrigation system or track manual watering system is to be operational
- A continuous impact attenuating barrier shall be installed that is equal to or greater than 1.2 m in height and commence a minimum of 20 m before the bend and extend a minimum of 10 m beyond the bend;
- All surfaces within the catching pen shall be lined with an impact attenuating barrier;
- Starts will be either from boxes erected on straight sections; chutes, 'drop-on', or 'roll-on' configuration; if there are bend starts or starts within 40m of the commencement of a semi-circular bend, the distance from the start position to the turn is crucial to safety and the positioning of the start is to be supported by scientific evidence.
- The minimum width of the track shall be 5.0 m;
- There shall be no obstacles, such as starting boxes, that protrude within the 5.0 m minimum track width easement;
- An outside rail/ barrier surrounding the whole circumference of the track shall be in place;
- Where a cable lure is installed, a safety rail shall be installed on bends on the inside rail; the safety rail may double as the irrigation system or can be a purpose installed rail. The

	<p>rail can be either tubular or rectangular and must be constructed from material approved by and passed safe by GRNSW.</p> <ul style="list-style-type: none"> • The lure shall extend a minimum of 1.2 m when measured from the guide rail; • The lure-to-track clearance shall be less than or equal to 100 mm when measured from the highest point on the track surface; and • The lure system shall have the capability of reaching a maximum velocity of 30 m/s. • Where a cable lure is installed the lure control are to have a 'dead man' – cut out switch to shut off power, ideally in two x separate locations to allow for emergency shutoff
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Bend Starts: A risk assessment be undertaken by UTS using the GFTMEA Assessment to rank the starts at tracks from high, medium to low.

Racecourse Major Rebuilds

For tracks subjected to a major rebuilds the following design constraints are required:

Specifications	<ul style="list-style-type: none"> • All transitions from straights to semi-circular bends shall be clothoidal and the lateral jerk limited to 4.0 m/s^3 when measured horizontally 1.0 m from the lure rail;
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- The cross-fall grade for any semi-circular section within of the track shall be constant from where the semi-circle commences to where it ends;
- The cross-fall grade of semi-circular sections within the track shall be equal to or no more than 10% unless the bend radius is greater than or equal to 60 m whereupon the cross-fall may be eight percent (8%);
- For clothoidal sections of the track the cross-fall grade shall transition linearly from where the clothoid commences to where it ends;
- A concrete edging strip shall be installed on the inside and outside track circumferences;
- All cross-falls shall be linear between the inside to outside concrete edging strips and vary by less than +/-10 mm across the width of the track;
- The installed reduced level (RL) of the concrete edging strips shall be per the engineering design;
- The shape of the inner concrete edging strip shall follow the lure rail;
- The lure rail shall overhang inner concrete edging strip by at least 200 mm and this overhanging off-set distance constant;
- The lower concrete edging strip shall have a drainage system installed at its foot that allows the controlled retention and discharge of water;

- A (sand) track running surface shall be a minimum of 150 mm in depth;
- A track irrigation system is to be installed and operational
- A layer of geotextile fabric shall be installed between the bottom of the sand track running surface and the top of the sub-base;
- The sub-base surface height shall mirror the RL of the track running surface;
- The sub-base surface shall have no areas where ponding of water can occur and be capable of fully draining via the drainage system installed beneath the lower concrete edging strip;
- The minimum track radius on bends shall be equal to or greater than 50 m;
- All starts should be on the straight section of the track and will be either of a chute start, 'drop-on', or 'roll-on' configuration; if there are bend starts or starts within 40m of the commencement of a semi-circular bend, the distance from the start position to the turn is crucial to safety and the positioning of the start is to be supported by scientific evidence.
- The width of the track shall be at least 6.0 m;
- There shall be no obstacles, such as starting boxes, that protrude within the 6.0 m minimum track width easement;
- An outside rail/ barrier surrounding the whole circumference of the track shall be in place;

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| | <ul style="list-style-type: none">• Where a cable lure is installed, a safety rail shall be in place on the inside rail; the safety rail should be clear plastic where required or made of material approved by GRNSW to not obscure race vision; the safety rail may double as the irrigation system, providing it is approved by GRNSW.• The recommended minimum height of the uppermost edge of the safety rail should be 625 mm when measured from the track surface 1.0 m from the rail¹;• The safety rail shall not obscure video coverage of the race²;• A continuous impact attenuating barrier shall be installed that is equal to or greater than 1.2 m in height and commence a minimum of 20 m before the bend and extend a minimum of 10 m beyond the bend that records a performance³ less than $200g_{max}$ at a 3.0 m free height of fall⁴; |
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⁴ **Safety rail height investigation** (for Greyhound Racing Victoria), 10 January 2019.

⁴ Technical solutions such as additional cameras may be required to meet this technical requirement.

⁴ A suitable testing procedure can be found in Australian Standard AS 4422:2016 Playground surfacing – Specifications, requirements and test method.

⁴ A 3.0 m free height of fall is equivalent to an impact at a velocity of 7.7 m/s (27.6 km/hr).

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| | <ul style="list-style-type: none">• All surfaces within the catching pen (if provided) shall be lined with an impact attenuating surface that records a performance less than $200g_{max}$ at a 3.0 m free height of fall;• The lure system shall have the capability of reaching a maximum velocity of 30 m/s;• The lure system shall reach a velocity of 18 m/s in 40 m in all reasonable climatic conditions including torrential rain and a relative humidity range from 5% to 100%;• A cable or battery operated lure shall be fitted with a braking and reversing system that is fit for purpose;• The lure braking and reversing system shall be capable of varying the lure velocity (braking) from 18 m/s to 0 m/s within 15 m;• Where a cable lure is installed the lure control are to have a 'dead man' – cut out switch to shut off power, ideally in two x separate locations to allow for emergency shutoff; and• The lure system performance criteria shall be achieved within an operating thermal environment range from -5°C to 40°C. |
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Green Field (New) Tracks

For green field tracks the following design constraints are required:

Specifications	<ul style="list-style-type: none">• All transitions from straights to semi-circular bends shall be clothoidal and the lateral jerk limited to 2.0 m/s^3 when measured horizontally 1.0 m from the lure rail;• The cross-fall grade for any semi-circular sections within the track shall be constant from where the semi-circle commences to where it ends;• The cross-fall grade of semi-circular sections within the track shall be equal to or greater than eight percent (8%);• For clothoidal sections of the track the cross-fall grade shall transition linearly from where the clothoid commences to where it ends;• A concrete edging strip shall be installed on the inside and outside track circumferences;• All cross-falls shall be linear between the inside to outside concrete edging strips and vary by less than $\pm 10 \text{ mm}$ across the width of the track;• The installed RL of the concrete edging strips shall be per the engineering design;• The shape of the inner concrete edging strip shall follow the lure rail;
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- The lure rail shall overhang the inner concrete edging strip by at least 200 mm and this overhanging off-set distance constant;
- The lower concrete edging strip shall have a drainage system installed at its foot that allows the controlled retention and discharge of water;
- A sand track running surface shall be a minimum of 150 mm in depth;
- An automated track irrigation system is to be installed and operational
- A layer of geotextile fabric shall be installed between the bottom of the sand track running surface and the top of the sub-base;
- The sub-base surface height shall mirror the RL of the track running surface height;
- The sub-base surface shall have no areas where ponding of water can occur and be capable of fully draining via the drainage system installed beneath the lower concrete edging strip;
- The minimum track radius shall be equal to or greater than 65 m;
- All horizontal transitions shall be clothoidal and the installed rail tolerance vary less than +/-2 mm from the engineering design as determined by a laser theodolite;
- All starts should be on the straight section of the track and will be either of a chute start, 'drop-on', or 'roll-on' configuration.

- The width of the track shall be at least 6.5 m;
- There shall be no obstacles such as starting boxes that protrude within the 6.5 m minimum track width easement;
- An outside rail/ barrier surrounding the whole circumference of the track shall be in place;
- Where a cable lure is installed, a safety rail shall be in place on the inside rail on bends; the safety rail should be clear plastic where required to not obscure race vision
- The recommended minimum height of the uppermost edge of the safety rail should be 625 mm when measured from the track surface 1.0 m from the rail;
- A continuous impact attenuating barrier shall be installed that is equal to or greater than 1.2 m in height and commence a minimum of 20 m before the bend and extend a minimum of 10 m beyond the bend that records a performance less than $200g_{max}$ at a 3.0 m free height of fall;
- All surfaces within the catching pen (if provided) shall be lined with an impact attenuating surface that records a performance less than $200g_{max}$ at a 3.0 m free height of fall;
- The lure shall extend a minimum of 1.6 m onto the track when measured from the lure rail;

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| | <ul style="list-style-type: none">• The lure to track clearance height shall be less than or equal to 100 mm when measured at the highest point on the track surface;• The lure system shall be the best and safest technology available.• The lure system shall have the capability of reaching a maximum velocity of 30 m/s;• The lure system shall reach a velocity of 18 m/s in 40 m in all reasonable climatic conditions including torrential rain and a relative humidity range from 5% to 100%;• The lure shall be fitted with a braking and reversing system that is fit for purpose;• The lure braking and reversing system shall be capable of varying the lure velocity (braking) from 18 m/s to 0 m/s within 15 m;• Where a cable lure is installed the lure control are to have a 'dead man' – cut out switch to shut off power, ideally in two x separate locations to allow for emergency shutoff; and• The lure system performance criteria shall be achieved within an operating thermal environment range from -5 °C to 40 °C. |
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¹ The logistics of transitioning all GRNSW tracks to the green field design and construction may require that in some instances there be an intermediate category of track that is neither an existing nor a green field design. The intermediate design is required for tracks where the block of land on which the track is situated does not allow a full green field development. It is envisioned that within a decade all GRNSW tracks will comply with 'green field' design constraints.