

Terraffic Pty Ltd

Traffic and Parking Consultants

ABN 83 078 415 871

12th July 2022
Ref 20071

The General Manager
Northern Beaches Council
59A Old Barrenjoey Road
Avalon Beach NSW 2107

Dear Sir/Madam,

**DA2021/0508: PROPOSED OFF-STREET CARPARKING
60 CHISHOLM AVENUE, AVALON BEACH**

Terraffic Pty Ltd has been engaged by Andy Lehman Design to assess the proposed off-street carparking and vehicular access arrangements for the abovementioned development site.

The existing dwelling on the site gains vehicular access via a Right of Carriageway (ROW) over 62 Chisholm Avenue. An unformed pathway links the ROW to the house. The intent of the Development Application is to remove the dependence on the ROW and create its own vehicular access and garage on the site.

The proposed access driveway is located within an existing turn bay on Chisholm Avenue. A 3.0m – 3.6m wide single lane ramp will connect the turn bay to a 5.9m long x 7.8m wide garage that can accommodate 3 parked cars in accordance with the Australian Standard AS/NZS2890.1:2004. A vehicle turntable is also proposed in the manoeuvring area to facilitate forward egress from the site and increase the safety of users.

A plan of the proposed access driveway and garage is reproduced in Annexure A.

Pittwater 21 DCP Requirements

Section B6.2 of the Pittwater 21 DCP notes the following with regard to Internal Driveways:

For Internal Driveways on steeply sloping or difficult sites, gradients may be increased up to 1:4 (V:H) over a maximum 20 metre length.

Provision is to be made for vehicles to enter and leave the site in a forward direction, where:

- *the internal driveway grade exceeds 1:4 (V:H);*
- *the land abuts a roadway subject to high pedestrian use (e.g. School, Commercial Centre);*

- driveways are more than 30m in length; and
- the driveway enters onto a classified road.

Variations

*For existing Internal Driveways on steeply sloping or difficult sites proposing dual occupancies, dwelling houses, secondary dwellings, exhibition homes, rural works dwellings and tourist and visitor accommodation, **gradients up to a maximum of 1:3 (V:H) may be maintained** subject to demonstration through a Traffic Assessment Report and the relevant certification that the Internal Driveway including surface finish is safe for its intended use.*

Any alternate design of the Internal Driveway (based on turning paths for a B85 vehicle) is to be in accordance with the current edition of Australian Standard AS/NZS 2890.1 "Parking Facilities Part 1" Off-Street Car Parking.

A variation may be considered subject to demonstration through a Traffic Assessment Report and the relevant certification that an alternate vehicular access arrangement to the site is safe for all pedestrian and vehicular traffic.

The Internal Driveway shall be contained within the driveway corridor. The minimum width of the driveway corridor (i.e. impervious pavements together with grassed shoulder area) shall be as follows:

- *Single Dwelling: 3.0 metres minimum.*

As per the requirements of AS/NZS2890.1:2004 and the DCP, the proposed access ramp incorporates 2.0m long transitions with a maximum change in grade of 12.5% (1 in 8) and a maximum grade of the ramp is 25% over a distance of 14.74m.

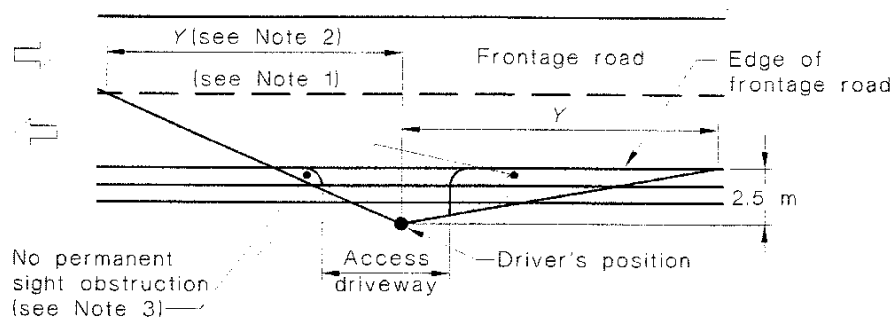
Furthermore, the 3.0m wide driveway satisfies the minimum requirements of the DCP while the curved section of ramp satisfies Clause 2.5.2(b) of the Australian Standard. A copy of Table 2.2 and Figure 2.9 of the Standard are reproduced in Annexure B. As can be seen, curved domestic ramps with an outer radius of 7.6m require a roadway width of 3.6m.

Swept Path Analysis

As noted above, the proposal incorporates a vehicle turntable to facilitate forward egress from the site. The swept paths of the Australian Standard B99 Vehicle (Ford Falcon) entering and exiting the site are reproduced in Annexure C. As can be seen, this larger vehicle can make the manoeuvre with a single turn with parked cars opposite the proposed driveway.

Driver Line of Sight

Figure 3.2 of AS/NZS2890.1:2004 is reproduced in the following pages and nominates the required sight line distances for drivers exiting a driveway. As can be seen, a domestic property with a frontage road speed of 50km/h requires a minimum sight line of 40m to oncoming traffic.



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2 nd and 3 rd columns
100	139	160	
110	153	190	

NOTES:

- 1 Centre-line or centre of road (undivided road), or right hand edge of right hand through lane (divided road).
- 2 A check to the left is not required at a divided road where the median is wide enough to shelter a vehicle leaving the driveway.
- 3 Parking on this side of the frontage road may need to be restricted on either side of the driveway so that the sight distance required by the above table to an approaching vehicle is not obstructed.
- 4 This is the posted or general speed limit unless the 85th percentile speed is more than 5 km/h above the limit in which case the tabulated speed nearest the 85th percentile shall be adopted.
- 5 The values in the table apply only to left turn and right turn manoeuvres into two-way roads up to four lanes wide and one-way streets regardless of width, either for a 5 s gap, desirable at lower frontage road speeds, or minimum stopping sight distance based on 2 s reaction time.
Crossing manoeuvres (e.g. from an access opposite the stem of a T-junction) over four lanes or more, and turning manoeuvres into a six lane two-way road would require longer gaps unless there was a median wide enough to store a vehicle and allow a two stage manoeuvre.
- 6 These distances are based on stopping sight distances with reaction time of 1.5 s for traffic approaching along the frontage road and are applicable to a frontage road speed of up to 80 km/h only. Wherever practicable sight distance provided at domestic property accesses should meet the values given in the second or third columns of the Table.
- 7 When checking sight distance the driver's eye height and the height of the object (approaching vehicle) are to be taken as 1.15 m above the road surface.

FIGURE 3.2 SIGHT DISTANCE REQUIREMENTS AT ACCESS DRIVEWAYS

A site inspection revealed that while vehicles are travelling at less than 50km/h, the available sight lines exceed 40m in both directions and therefore satisfy the Standard.



Line of sight to the north



Line of sight to the south

Turntable Specifications

While a specific turntable manufacturer has not been determined at this stage of the development application process, it is anticipated that it will be similar to the Australian Turntable Company CTX Turntable.

The specifications for this turntable are reproduced in Annexure D and notes that the “*Recommended Maximum Incline*” that a turntable can be installed is 1 in 12 (8.3%). The proposal satisfies this requirement with a maximum incline of 5.4% in the manoeuvring space.

In the circumstances, the proposed access driveway and parking arrangements are considered acceptable and will have no safety implications for users or passing traffic on Chisholm Avenue.

Should you require any further information, please do not hesitate to contact Michael Logan on 0411 129 346 during business hours.

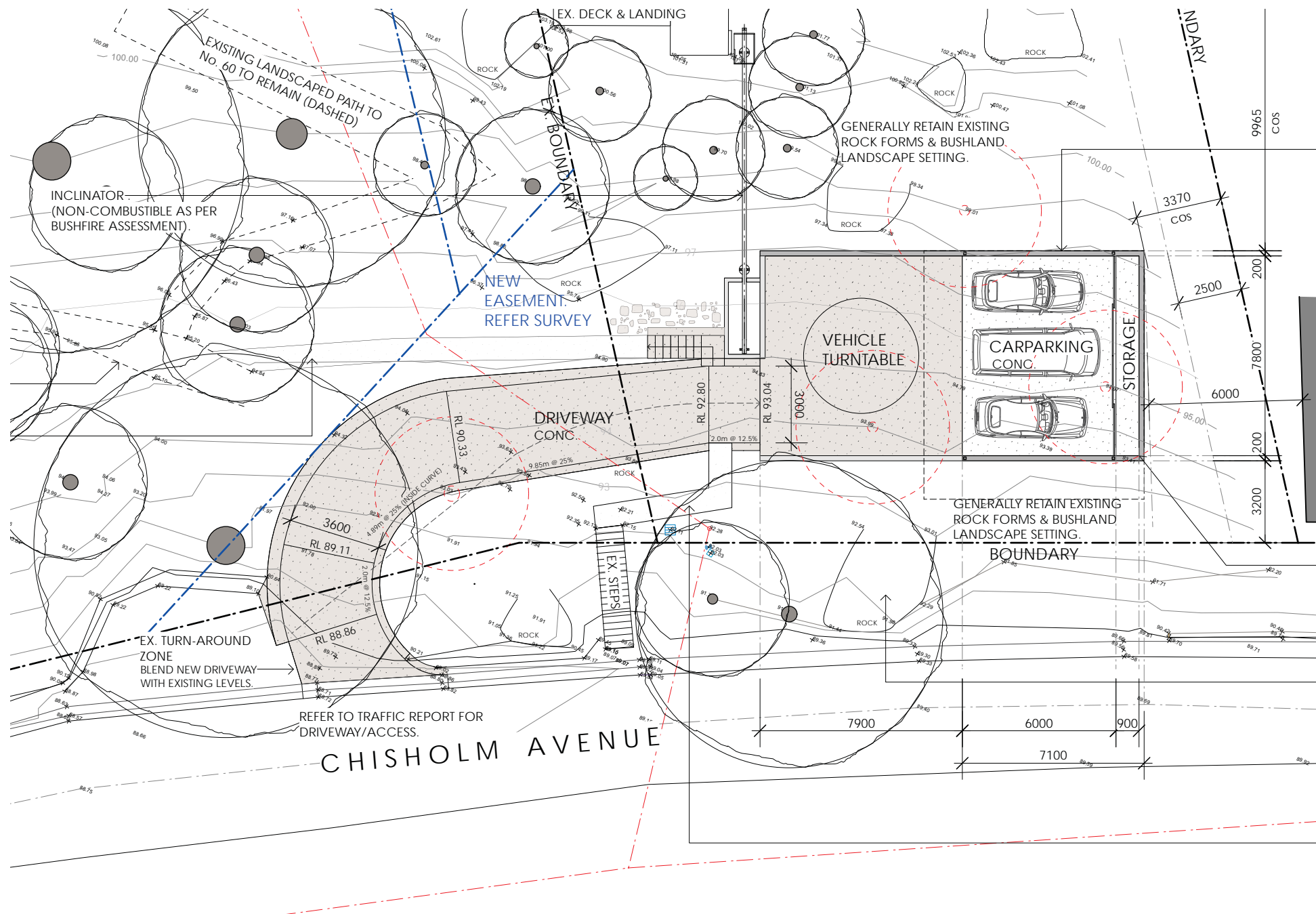
Yours faithfully

A handwritten signature in black ink, appearing to read 'M Logan', with a long horizontal stroke extending to the right.

Michael Logan *MTraff* (*Monash University*)
Director
Terraflow Pty Ltd

ANNEXURE A

PLAN OF THE PROPOSED ACCESS DRIVEWAY AND GARAGE



ANNEXURE B

CURVED RAMP REQUIREMENTS

TABLE 2.2
MINIMUM ROADWAY WIDTHS ON CURVED ROADWAYS AND RAMPS

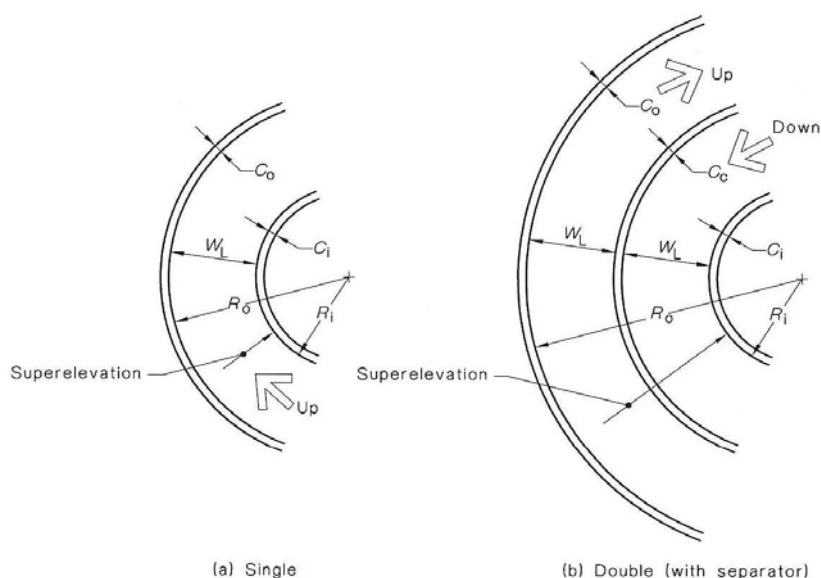
Turn radius R_o (Note 1)	Single lane		Two-way, no separator All cases (Note 3)
	Public facilities (Note 2)	Domestic property	
7.6 to 11.9	3.9	3.6	—
12.0 to 19.9	3.4	3.1	6.7 (Note 4)
20.0 to 50.0	3.2	3.0	6.3
>50.0	3.0	3.0	5.5

NOTES:

- 1 See Figure 2.9 for Dimension R_o .
- 2 In New Zealand only, the widths shown for domestic property shall apply also to public facilities.
- 3 For parallel roadways with a median or separator, each roadway width shall be determined separately as a single lane.
- 4 Applies to R_o range 15.0 m to 19.9 m only (see Clause 2.5.2(b)).

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AS/NZS 2890.1:2004



Characteristic	Limiting dimensions, m	
	One-way	Two-way
Outside radius, R_o	7.6 min.	11.8 min.
Inside radius, R_i	4.0 min.	4.0 min.
Lane width, W_L	See Table 2.2	See Table 2.2
Clearance to obstruction—		
(a) inside, C_i	0.3 min.	0.3 min.
(b) outside, C_o (see Note)	0.5 min.	0.5 min.
(c) between paths, C_c	—	0.6 min.
Superelevation	1 in 20 (5%) max.	1 in 20 (5%) max.

NOTE: This clearance will be sufficient to allow the outside front wheel to touch the kerb before the vehicle body can contact the obstruction.

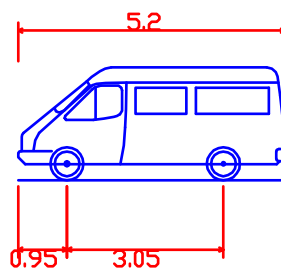
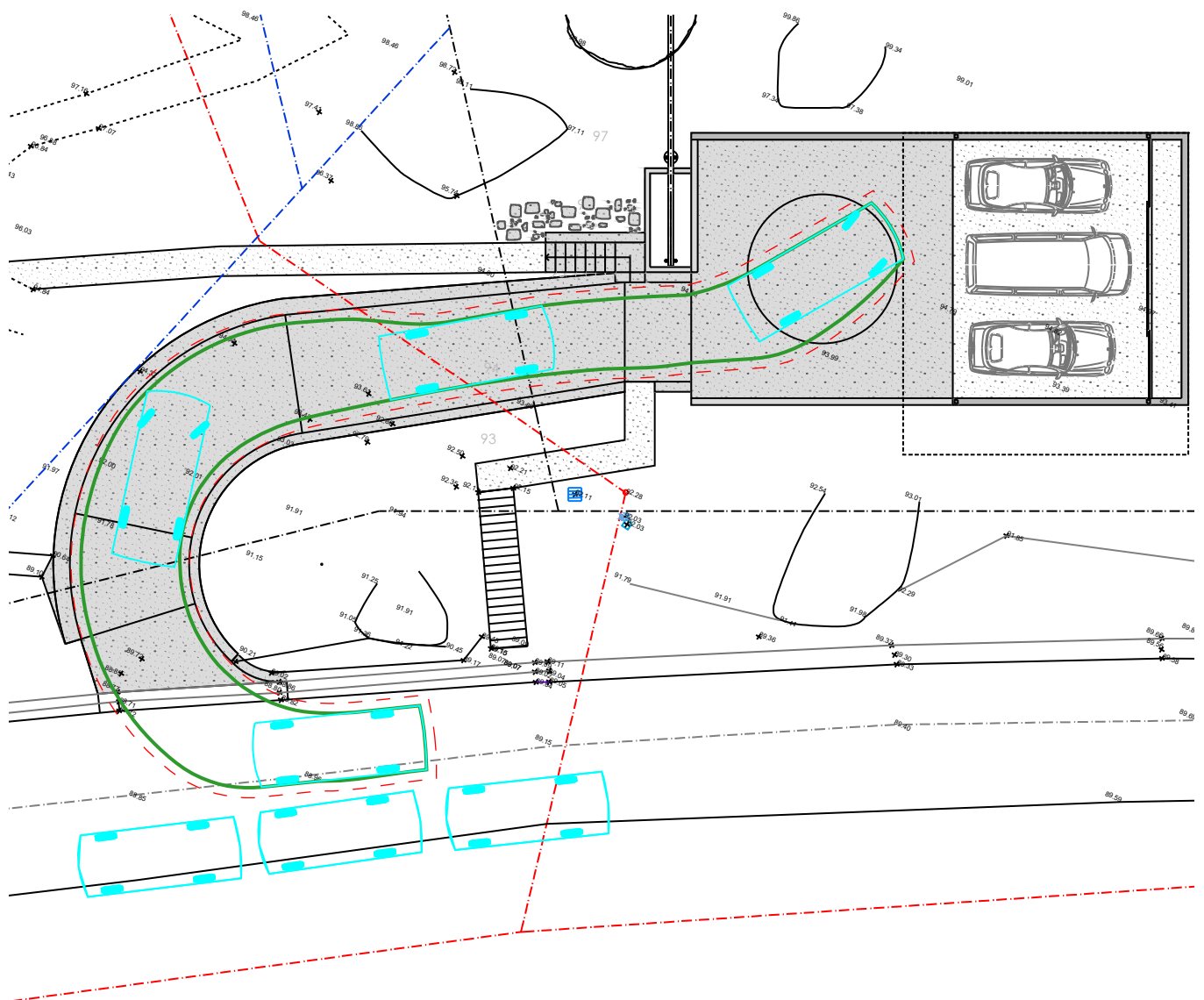
FIGURE 2.9 DIMENSIONS OF CURVED CIRCULATION ROADWAYS AND RAMPS

ANNEXURE C

SWEPT PATH ANALYSIS

Path prepared using
Autodesk Vehicle Tracking

0 2 4 6 8 10 20
METRES
SCALE 1:200



B99 Vehicle (Realistic min radius) (2004)
Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 2.200m
Min Body Ground Clearance 0.312m
Track Width 1.840m
Lock to Lock Time 4.00s
Curb to Curb Turning Radius 6.250m

— Vehicle Path
- - - 300mm Clearance Path

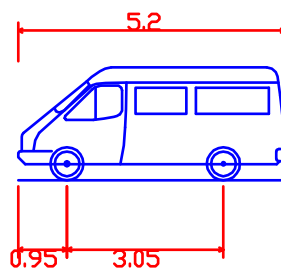
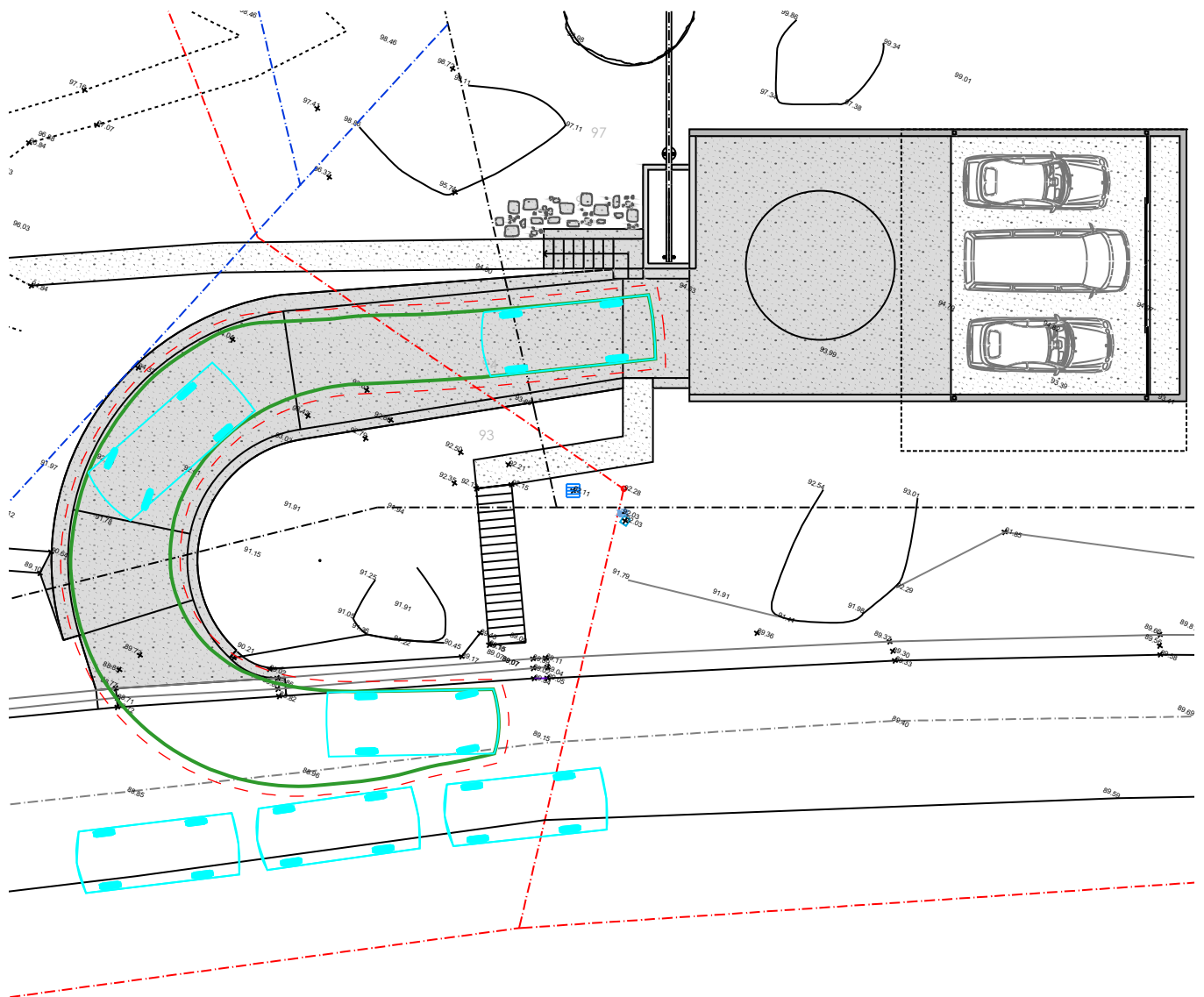


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**Manoeuvring Path of Australian
Standard AS/NZS2890.1:2004
B99 Vehicle Entering Site**

Path prepared using
Autodesk Vehicle Tracking

0 2 4 6 8 10 20
METRES
SCALE 1:200



B99 Vehicle (Realistic min radius) (2004)
Overall Length 5.200m
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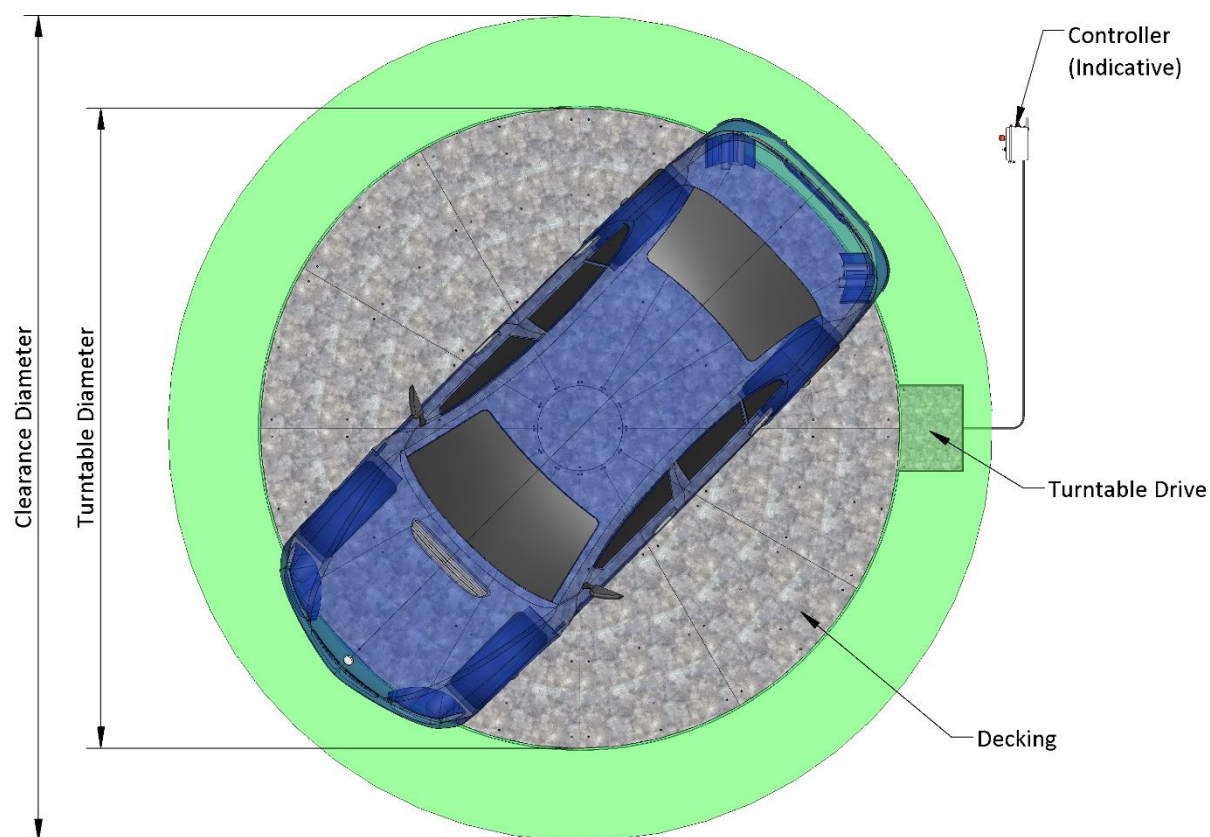
Terraflow Pty Ltd
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**Manoeuvring Path of Australian
Standard AS/NZS2890.1:2004
B99 Vehicle Exiting Site**

ANNEXURE D

TURNTABLE SPECIFICATIONS

CTX Turntable Specification

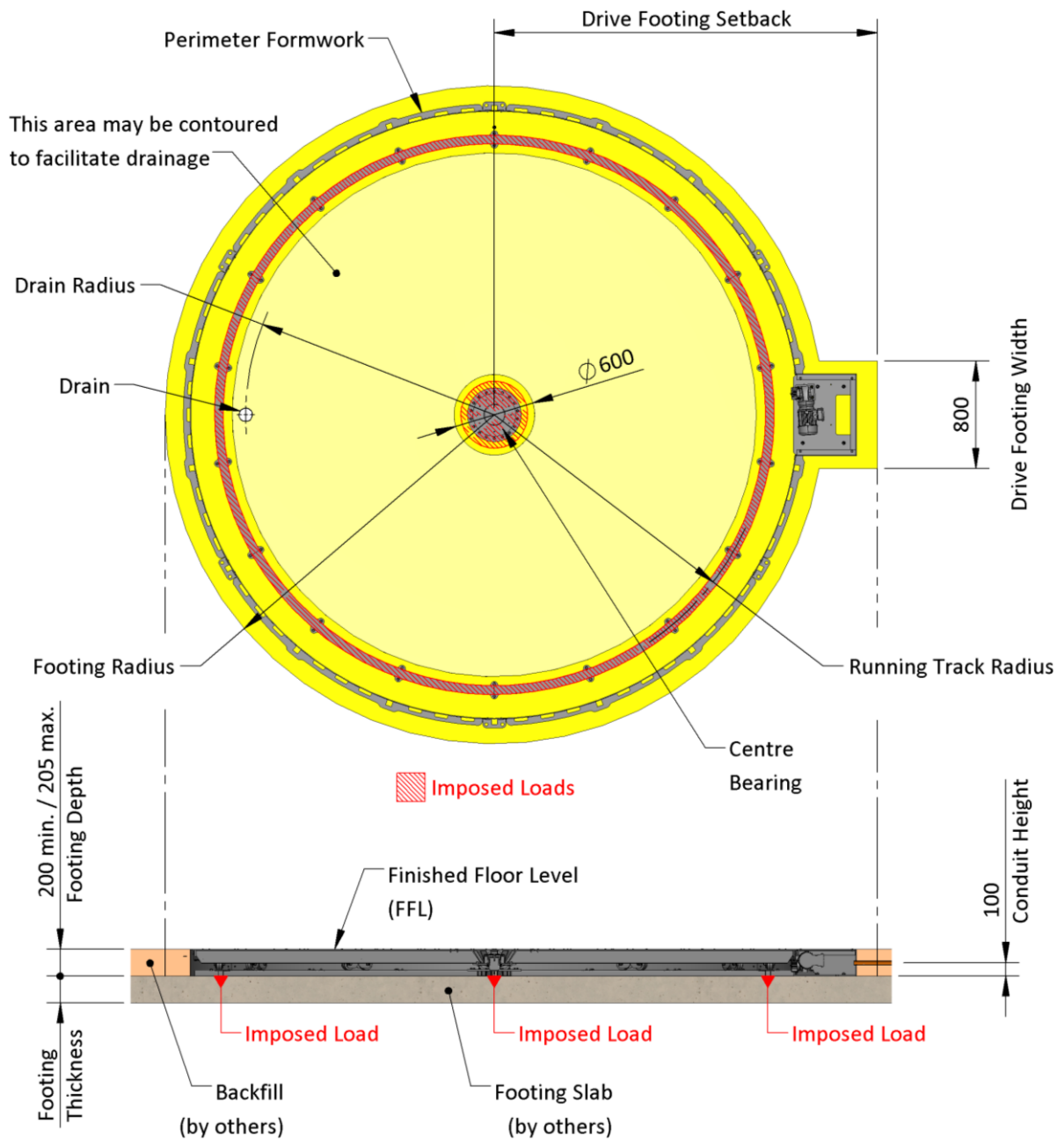


**See Specification table for dimensions*

Turntable Overview

Application:	Driveway, basement, car parking
Platform Finish:	Hot dipped galvanised chequer plate – 5mm thick
Inspection Hatches:	Centre bearing and drive. Decking removable for access to Running Track/Drain
Corrosion Protection:	Hot dipped galvanised, zinc coating
Drive Mechanism:	Gear driven powered by motor drive
Custom Platform Finish: (Optional extra)	Customised platform options such as timber can be accommodated. Please discuss with ATC
Stainless Steel formwork: (Optional extra)	Recommended for projects where a polished concrete finish is specified. This allows the grinding process to be applied to the concrete and the steel formwork without risk of surface rust becoming visible.
Stainless Steel Upgrade: (Optional extra)	Stainless-steel upgrade for bearings, shafts and fixings recommended for projects exposed to a salty or corrosive environment.
Safety system: (Optional extra)	For projects where there is a chance of collision during rotation with people, building or other vehicles ATC can design and supply a system to reduce risk.
Positional or Home function: (Optional extra)	ATC can design and supply any requirements for positional stopping or for the turntable to return to a home position after use. The home position is commonly used on projects with tiled or paver finish.

Turntable Footing



**See Specification table for dimensions*

Footing Overview

1. The turntable footing provides the surface which the turntable is secured to via mechanical fastenings of up to 100mm embedment.
2. The footing size is larger than the turntable to accommodate the perimeter formwork and fixtures.
3. The overall size and shape of the footing can be made to suit the installation site provided it can accommodate the minimum required footing sizes as indicated below.
4. Once the turntable has been installed, a concrete backfill is poured up to the perimeter formwork to encase the turntable into the finished floor.
5. The imposed loads on the footing are concentrated through the Centre Bearing area and the Running track.

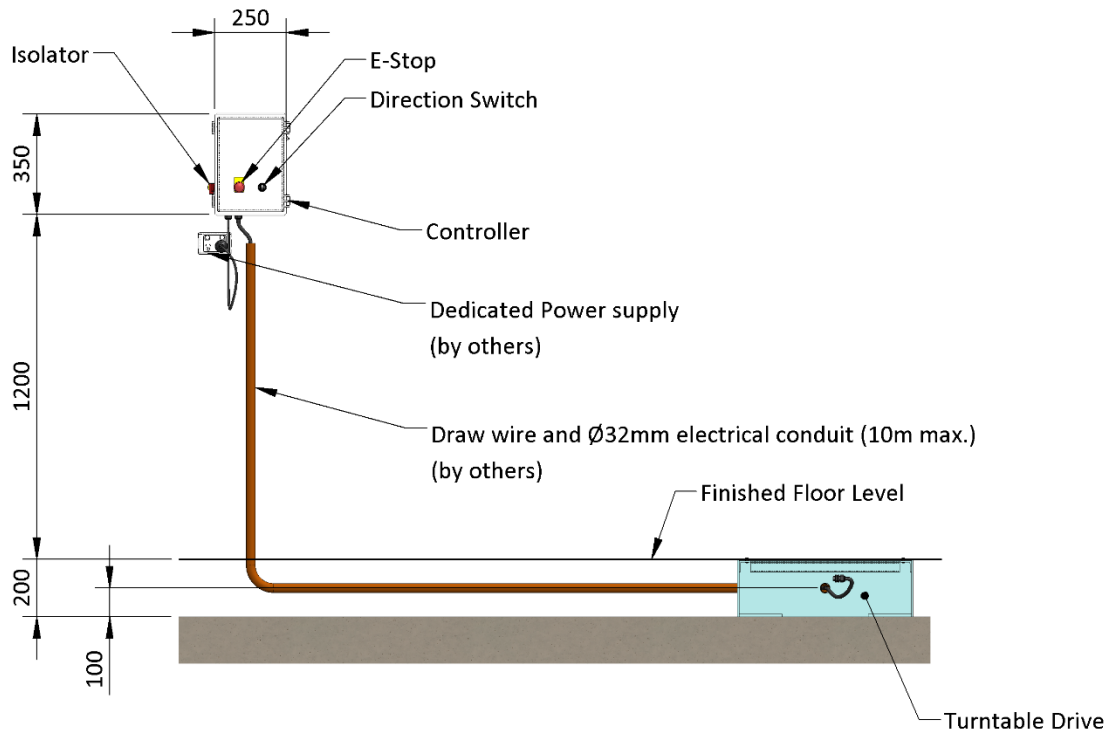
Turntable Specifications

Model	CTX4	CTX45	CTX48
Turntable Diameter (mm)	4000	4500	4800
Vehicle accommodated ⁽¹⁾	B85	B99	B99
Clearance Diameter (mm) ⁽²⁾	5800	6000	6000
Footing Depth (mm) ⁽³⁾	200 min. / 205 max.		
Footing Radius (mm)	2200	2450	2600
Drain Radius (mm) ⁽⁴⁾	1600	1850	2000
Drive Footing Width (mm)	800	800	800
Drive Footing Setback (mm)	2600	2850	3000
Running Track Radius (mm)	1800	2050	2200
Operating Capacity (kg)	4000		
Operating Speed (Nominal RPM)	1		
Distributed Load Capacity (kPa) ⁽⁵⁾	5		
Imposed Load - Centre (kN) ⁽⁶⁾	24	30	34
Imposed Load - Running Track (kN) ⁽⁶⁾	48	60	68
Minimum Concrete strength (MPa) ⁽⁷⁾	25		
Footing Thickness ⁽⁷⁾	Subject to client engineering		
Recommended Maximum incline ⁽⁸⁾	1:12 (5°)		

Notes

- Vehicle classification AS/NZS 2890.1:2004 Parking facilities - Off-street car parking
- Suggested clearance diameter based on the nominated vehicle positioned correctly on the turntable.
- Footing surface to be steel trowel finished.
- Drainage type and capability is to be specified by the client engineer. Please note grease traps or sump pits are not required specifically for the turntable.
- Structural load capacity to AS/NZS 1170.1, Medium Vehicle. Vehicles exceeding 2500 kg and not exceeding 10,000 kg. Allows for full use of turntable area as a general trafficable area.
- All structural design and imposed loads to AS/NZS 1170.0, Permanent and imposed action. Loads stated are unfactored loads based on the Distributed Load Capacity.
- Slab thickness and strength is to be specified by the client engineer.
- The turntable can be installed on an inclination in any single direction. An installation surcharge will apply. Contact ATC for inclinations greater than this

Electrical & Control



Feature	
Direction of Rotation	Bi-directional
Start-up	Soft start/stop, ramp up/ramp down
Controller	Variable Speed Drive
Operation	Hand held, key-fob remote (5 buttons) and manual switch at control box location
Safety Inclusions	Emergency stop, isolation switch at control box location
Motor Power (kW)	0.37
RCD Type Required (by customer)	Type D
Power Supply Required	AC – 240V 50Hz 10Amps
Minimum Design Standard	AS/NZ 3000
Power Consumption during operation	1 amp