The Corporation of the City of Niagara Falls

Traffic Considerations for
Site Plan Preparation

Adopted May 2006
Amended November 2011

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Addendum
March 2007 Minimum Corner Clearance pg. 7 (Arterial Roads - Traffic Signal Control)
November 2011 TDM Strategies, per the STMP, 2011 - See Section 3.0 and 3.2

1.0 INTRODUCTION

To assist the applicant in the preparation of a site plan, the following is provided. Although an attempt has been made to include all relevant issues related to Parking & Traffic, it is virtually impossible to identify all applicable conditions for every possible scenario. Therefore, applicants should reference the Geometric Design Manual for Canadian Roadways, published by the Transportation Association of Canada, 2000 for additional details. For site plans requiring a Traffic Impact Study refer to "Guidelines for the Preparation of Transportation Impact Studies and Site Plan Review". Questions related to this document may be directed to Transportation Services Department at 905-356-7521.

1.1 Road Authority

The applicant should be aware that there are the following road authorities are located within the City of Niagara Falls. Site plan may be subject to review by several authorities depending on the site location. It is the responsibility of the applicant to ensure that the appropriate authorities are circulated to obtain the necessary approvals.

- Federal
- Provincial (MTO)
- Regional (Niagara Region)
- Niagara Parks Commission
- City of Niagara Falls

The following information is applicable only at locations where a site abuts a City of Niagara Falls road. Requirements from other authorities may vary.

2.0 SITE PLAN CONTENT

All site plans will illustrate the following:

2.1 Site Plan Scale

The site plan should be prepared at a scale of 1:200 or 1:500. All dimensions must be in metric.

2.2 Site Location

- street name, address, site map
- existing right-of-way on adjacent streets
- existing daylight triangles
- parking control and signage on both sides of street abutting the site
- Existing and proposed easements
- Property lines, angles and lengths

2.3 Site Layout

- Building footprint and location
- All building entrances, garages, loading docks and service areas
- Pick-up and drop-off areas
- Utilities within property boundaries - Water lines, Sanitary sewer, Storm sewer, Gas, Electric, if overhead or underground, Fire hydrants, Light poles and illumination, Electrical, telephone, cable, or postal kiosks and signs
- Access location and design, including
  - Angle
  - Curb return radius
  - Throat width
  - Throat length
  - Channelization
  - Turn bays
  - Driveway and aisle way profiles (one way or two way)
  - Driveway and lane measurements
  - Number of lanes
  - Traffic control at internal intersections
  - Existing and proposed signs
- Parking lot layout, including
  - Parking angle, Stall size, Aisle width
  - Number of stalls in each row of parking
  - Short term parking areas
  - Reserved parking areas
  - End island location and shape indicating if painted, curbed or landscaped
  - Location and number of disabled spaces
  - Location of motorcycle and bicycle spaces
- All sidewalks including those abutting the building, whether the sidewalks are elevated
- Pedestrian walkways providing connection to streets and abutting developments
- Location and orientation of refuse compactors and dumpsters
- Fire lanes and fire vehicle turning path

3.0 SITE DESIGN CONSIDERATIONS

Strategies promoting the reduced dependence on the private automobile are taken into consideration during the site plan review. The development of the site should accommodate facilities that incorporate transportation demand management (TDM) initiatives as outlined in the Sustainable Transportation Master Plan Study, 2011. The initiatives include active transportation, transit, car sharing, employee participation and awareness.

The following should be taken into consideration when designing the site.

3.1 Vehicle Types Accessing the Site

- Passenger vehicles
- Delivery vehicles
- Service vehicles
- Shuttle buses and/or tour buses
- Transit buses
- Taxis
- Emergency vehicles
- Cyclists
- Pedestrians

3.2 Parking Layout

- Queuing at accesses
- Corner clearances prior to first parking access opportunity
- Orient perpendicular to building access
- Consider winter maintenance functions (snow storage capability)
- Reserve land for future parking expansion capabilities
- Designated parking stalls for disabled persons
- Preferential parking stalls for car pooling
- Preferential parking stalls for electric/green vehicles
- Pedestrian, cycling and transit friendly road network

3.3 Pedestrian & Cycling Facilities

- Separate vehicular and pedestrian traffic; minimize pedestrians walking through parking area
- Provide sidewalks and ensuring that sidewalks are not obstructed by overhang of vehicle
- Minimize crossing distances across internal roadways
- Signed and marked crossing areas
- Provide access from on-street facilities
- Bicycle storage areas
- Direct pedestrians and cyclists to where you want them to cross

3.4 Transit and Taxi's

- For large developments, locate transit and taxi facilities on-site and close to entrances
- Provide sidewalk to existing on-street locations

3.5 Loading Areas - Delivery/Service/Tour Bus

- All forward and reversing manoeuvring to be carried out on private property
- Locate delivery/service areas away from primary parking sites
- Provide on-site storage space for an adequate number of vehicles provided, such as tour buses
- Ensure all manoeuvring takes place without using adjacent parking stalls
- Entire vehicle must be contained within the private property limits when delivering or carrying out service

3.6 Manoeuvring of Vehicles

- The manoeuvring of service and delivery vehicles must be carried out on-site without the use of city right-of-way
- Large vehicles must be able to enter the site in a forward motion and leave the site in a forward motion. Reversing onto the road allowance is not considered as an acceptable alternative
- All manoeuvring takes place without using adjacent parking stalls
- Turning paths of all vehicles the size of a cube van and larger must be plotted using AutoTurn or other similar software. The vehicle type, code, dimensions and wheel base shall be noted.

3.7 Signs and Markings

- Use conformity and consistency application
- Use directional signs at accesses for one way movements (one way, do not enter, etc.)
- Paint directional arrows for one way movements
- Use signs to direct motorists to external roadways/exits
- All signs must be placed within the limits of the property
- Advertising signs must be forwarded for review and approval to Building & Bylaw Services

3.8 Visibility

- Ensure unobstructed visibility at:
  - Accesses
  - Pedestrian crossing locations

- Reduced visibility may be caused by the following
  - Signs
  - Shrubbery
  - Street hardware (benches, transit shelters, mailboxes, newspaper vending boxes, pedestrian rails, signs)
  - Garbage refuse
  - Grade of property

3.9 Drive Through Facilities

- Identify location of pick up window(s)
- Identify ordering location(s)
- Provide distance and queuing space between pick up window and ordering kiosk
- Provide distance and queuing space between pick up window and street
- Identify distance and queuing space between entry and ordering kiosk
- Identify drive through lane width
- Turn radius, if applicable
- Ensure design does not have pedestrians crossing drive through lane

4.0 DESIGN ELEMENTS

The following design elements shall be incorporated in the site plan.

4.1 Driveway Dimensions

Dimension (m)	Residential	Land Use: Light Industrial & Commercial	Land Use: Heavy Industrial
width	min - max	min - max	min - max
one-way	3.0 - 4.3 (single)	4.5 - 7.5	5.0 - 9.0
two-way	6.0 - 7.3 (double)	7.2 - 12.0	9.0 - 15.0
Right turn radius	3.0 - 4.5	4.5 - 12.0	6.0 - 15.0

4.1.1 Notes

- minimum driveway widths are normally used with radii at or near the upper end of the range
- radius requirements are dependant on type of vehicle accessing the site
- all vehicle manoeuvres shall be carried out from and to appropriate lane, without encroaching into opposing traffic flow
- increased widths may be considered for capacity purposes; where up to 3 exit lanes and 2 entry lanes are employed, 17.0 is the max width, exclusive of any median
- applicable to driveways only, not road intersections
- residential establishments with five (5) or more units are categorized as a commercial development with respect to access design standards
- curb returns on radii shall be contained within the extended line of the property limits and shall not encroach within the extension of the neighbouring property line
- all driveways shall have at least one (1) metre clearance from any utility structure
- any driveways exceeding 90m in length must be designed with a turning station for fire equipment
- The applicant will be requested to illustrate the turning paths of delivery/ service vehicles using either AutoTurn or other approved software package.
- **Refer to "Commercial Development Site Plan Minimum Requirements for Driveway Design" & Urban Residential Entrance OPSD 351.010 & Urban Industrial, Commercial and Apartment Entrances OPSD 350.010 in the list of Figures at the end of this document.**

4.2 Driveway Minimum Spacing

Driveway Spacing - use this information in conjunction with minimum corner clearance standards (below)

Dimension (m)	Land Use: Residential	Light Industrial & Commercial	Heavy Industrial
from corner on minor street at minor intersection	2.0	5.0	5.0
between driveway	1.0	3.0	3.0

4.2.1 Notes

- applies on minor streets and near minor intersections
- the above are measured the end of curve at driveway to beginning of curve at intersection (straight section only)
- **Refer to "Commercial Development Site Plan Minimum Requirements for Driveway Design" in the list of Figures at the end of this document.**

4.3 Minimum corner clearance

	No control/ Stop control	Traffic Signal Control
local roads - residential	11m	
local roads	15m	15m
collector roads	20 - 25m	25 - 55m
arterial roads	25 - 35m	70 m

4.3.1 Notes

- Measurements are taken from the driveway to the corner (measurements include radius at both the driveway and corner)
- higher values are used with higher traffic volumes
- **Refer to "Commercial Development Site Plan Minimum Requirements for Driveway Design" in the list of Figures at the end of this document.**

4.4 Minimum Clear Throat Lengths for Major Driveways

In order for major driveways to function efficiently, a clear zone is desirable to provide a conflict free storage area within the driveway.

Land Use	Development Size	Minimum Clear Throat Distance Collector	Arterial
Light Industrial	< 10,000 m²	6	15
	10,000 - 45,000 m²	15	30
	> 45,000 m²	15	60
Discount Store	<3,000 m²	6	15
	≥3,000 m²	6	25
Shopping Centre	<25,000 m²	6	15
	25,000 - 45,000 m²	15	25
	45,001 - 70,000 m²	25	60
	>70,000 m²	40	75
Supermarket	<2,000 m²	15	25
	>2,000 m²	25	40
Apartments	<100 units	6	15
	100 - 200 units	15	25
	>200 units	25	40
Quality Restaurant	<1,500 m²	6	15
	>1,500 m²	6	25
Drive-in Restaurant	<200 m²	6	25
	>200 m²	15	30
General Office	<5,000 m²	6	15
	5,000 - 10,000 m²	6	25
	10,001 - 20,000 m²	15	30
	20,001 - 45,000 m²	30	45
	>45,000 m²	40	75
Motel/Hotel/Lodging	<150 rooms	6	25
	>150 rooms	6	30

4.4.1 Notes

- Measurements are taken from the start of driveway curve.
- Driveway throats are to extend straight for the minimum clear throat distance
- For larger developments, the appropriate throat length is best determined by a detailed site-specific traffic impact study
- Clear throat lengths may be exempt from developments with less than 20 parking spaces at the discretion of the city
- **Refer to "Commercial Development Site Plan Minimum Requirements for Driveway Design" in the list of Figures**

4.5 Design Vehicle Dimensions (m)

	Front Overhang	Wheelbase	Rear Overhang	Total Length
Passenger Vehicle (P)	1.1	3.2	1.3	5.6
Single Unit - Light (LSU)	0.8	3.4	2.2	6.4
Single Unit - Medium (MSU)	0.8	6.5	2.7	10.0
Single Unit - Heavy (HSU)	0.8	8.4	2.3	11.5
Bus	2.2	7.2	2.8	12.2
Tractor Trailer	0.8	6.2/12.0	1.7	20.7
Front Loading Garbage Truck	2.3	5.4	2.5	10.2

4.6 Design Vehicle Radius (m)

	Centre line	Curb to Curb	Wall to Wall
Passenger Vehicle (P)	5.42	6.3	6.82
Single Unit - Light (LSU)	5.19	6.3	6.71
Single Unit - Medium (MSU)	10.08	11.1	11.59
Single Unit - Heavy (HSU)	13.14	14.2	14.65
Refuse	8.4		10.64

4.6.1 Notes

- Design vehicles used from Transportation Association of Canada (1999)
- Contact City of Niagara Falls Traffic & Parking Services for additional vehicle types
- Design templates available in **List of Figures for**
- **P (passenger car)**
- **LSU (light single unit)**
- **MSU (medium single unit)**
- **HSU (heavy single unit)**
- **B-12 (bus)**
- **WB-19 (tractor trailer)**
- **Front Loading Garbage Truck**

4.7 Number of Accesses

The number of driveways per lot shall be limited to:

Residential Zone

- 1 driveway for the first 15m of lot frontage
- 2 driveways for the first 30m of lot frontage; plus 1 additional driveway for each additional 30m of frontage thereafter

Commercial/Institutional/Open Space/Recreational/Industrial and any zone not classified

- 1 driveway for the first 15m of lot frontage
- 2 driveways for the first 30m of lot frontage; plus 1 additional driveway for each

additional 30m of frontage thereafter

Agricultural

- 2 driveways for the first 100m of lot frontage plus 1 driveway for each additional 100m of lot frontage thereafter

4.7.1 Notes

- Applicants requesting additional driveways over what is noted above must prove through a traffic impact study that the additional driveway is required to maintain an adequate level of service, rather than for convenience
- for corner lots the property is deemed to have frontage on both sides adjacent to the road
- access from commercial developments into residential areas will be restricted wherever possible. Applicants will be required to prove that the access is required to maintain an adequate level of service of operation, rather than for convenience.

4.8 Disabled Parking Stalls

As an owner/operator of a public parking facility that provides 50 or more parking spaces to the general public, the applicant is required under the City's Disabled Parking By-law 94-262, as amended to allocate the appropriate number of disabled parking spaces and display all signs and markings as required. Every owner and every operator of a public parking facility in Niagara Falls must provide the minimum number of designated parking spaces in their parking facilities as prescribed by the following table:

Number of Parking Spaces	Minimum Number of Spaces to be Reserved For Disabled Persons
Less than 50 spaces	Not required
50 - 99	1
100 - 199	2
200 - 499	5
500 - 999	10
1,000 or more total spaces	10 spaces plus 5 spaces for each additional 1,000 parking spaces or part thereof

Nothing in the by-law prohibits property owners from providing additional disabled parking spaces above the minimum requirement in the by-law.

Each parking stall reserved solely for vehicles operated by or carrying disabled persons must consist of the following:

4.8.1 Notes

- One authorized disabled parking sign on display, one '$300.00 Fine' sign tab directly beneath the authorized disabled parking sign
- Both signs are to be permanently installed at the front and centre of the parking stall and mounted at a height of 1.0 metres to 1.5 metres from the ground to the bottom of the sign
- Be a minimum of 3.9 metres (12 feet, 10 inches) in width and 6.0 metres (19 feet, 8 inches) in length
- Shall be marked with appropriate white pavement markings (lines and symbol) when located on a hard surface
- Located on a level surface
- Placed in a location as to minimize the distance to building entrances and exits and so as to permit the easy access to such entrances and exits

Authorized disabled parking signs, tabs, and hardware are available at cost from the Municipal Service Centre, 3200 Stanley Avenue, Monday to Friday, between the hours of 8:00 a.m. and 4:00 p.m. **Refer to Figure "Disabled Parking Sign Specification" and "Disabled Parking Spaces, Signs and Markings"**

4.9 Parking Stall Configuration

All tables are from City Zoning Bylaw

Surface Parking Area
Parking Spaces at Least 3.0m in width
Open building or structure inclusive of any building or structure parking

Angle Parking Space with Manoeuvring Aisle	**Minimum Perpendicular Length of Parking Space**	**Minimum Perpendicular Width of Manoeuvring Aisle**
More than 60 degrees, up to 90 degrees	6.0 metres (19.69 ft)	5.9 metres (19.36 ft) 2-way movement
More than 45 degrees, up to 60 degrees	6.4 metres (21.00 ft)	4.6 metres (15.09 ft) 1-way movement
More than 30 degrees, up to 45 degrees	6.0 metres (19.69 ft)	3.6 metres (11.81 ft) 1-way movement
0 degrees (parallel), up to 30 degrees	6.7 metres (21.98 ft)	3.0 metres (9.84 ft) 1-way movement

Surface Parking Area

Parking Spaces at Less than 3.0m wide but Not Less than 2.75m

Open building or structure inclusive of any building or structure parking

Angle Parking Space with Manoeuvring Aisle	Minimum Perpendicular Length of Parking Space	Minimum Perpendicular Width of Manoeuvring Aisle
More than 60 degrees, up to 90 degrees	6.0 metres (19.69 ft)	6.9 metres (22.64 ft) 2-way movement
More than 45 degrees, up to 60 degrees	6.4 metres (21.00 ft)	5.2 metres (17.06 ft) 1-way movement
More than 30 degrees, up to 45 degrees	6.0 metres (19.69 ft)	3.7 metres (12.14 ft) 1-way movement
0 degrees (parallel), up to 30 degrees	6.7 metres (21.98 ft)	3.0 metres (9.84 ft) 1-way movement

Covered Building or Structure Parking Area
Parking Spaces at Least 3.0m in width

Angle Parking Space with Manoeuvring Aisle	Minimum Perpendicular Length of Parking Space	Minimum Perpendicular Width of Manoeuvring Aisle
More than 60 degrees, up to 90 degrees	6.0 metres (19.69 ft)	5.9 metres (19.36 ft) 2-way movement
More than 45 degrees, up to 60 degrees	6.4 metres (21.00 ft)	4.4 metres (14.44 ft) 1-way movement
More than 30 degrees, up to 45 degrees	6.0 metres (19.69 ft)	3.6 metres (11.81 ft) 1-way movement
0 degrees (parallel), up to 30 degrees	6.7 metres (21.98 ft)	3.0 metres (9.84 ft) 1-way movement

Covered Building or Structure Parking Area
Parking Spaces at Less than 3.0m in width but Not Less than 2.75m

Angle Parking Space with Manoeuvring Aisle	Minimum Perpendicular Length of Parking Space	Minimum Perpendicular Width of Manoeuvring Aisle
More than 60 degrees, up to 90 degrees	6.0 metres (19.69 ft)	6.3 metres (20.67 ft) 2-way movement
More than 45 degrees, up to 60 degrees	6.4 metres (21.00 ft)	5.2 metres (17.06 ft) 1-way movement
More than 30 degrees, up to 45 degrees	6.0 metres (19.69 ft)	3.7 metres (12.14 ft) 1-way movement
0 degrees (parallel), up to 30 degrees	6.7 metres (21.98 ft)	3.0 metres (9.84 ft) 1-way movement

4.10 Driveway & Parking Area Construction

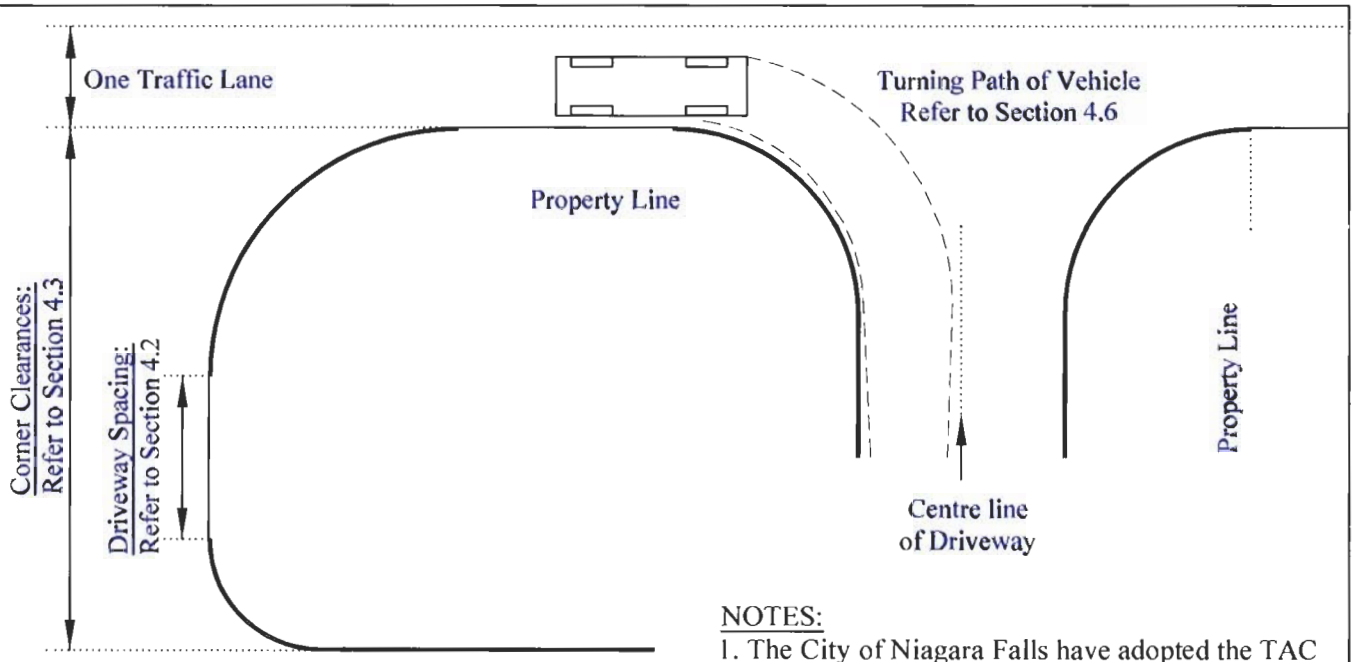
All asphalt parking areas shall have a minimum of the following cross section:

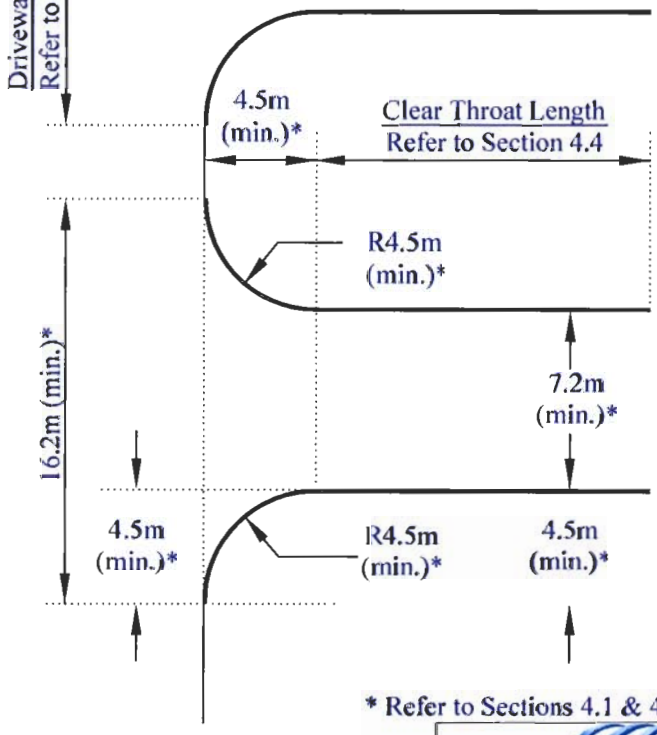
- 12 inches (300mm) Granular "A" base compacted to 100% proctor dry density
- 2 inches (50mm) HL 8 asphalt
- 1 inch (25mm) HL3 asphalt

All parking areas shall be asphalt paving or concrete paving , design and construction shall conform to the OPSD Volume 3 section 500, OPSD 350.010, 351.010.

The maximum grade on a driveway or entranceway shall be 10% with 8% being preferable.

FOLLOWING PAGES ARE LIST OF FIGURES





NOTES:

1. The City of Niagara Falls have adopted the TAC Manual for site plan design guidance. The designer is to refer to the Guide for applicable standards and interpretation.
2. The applicant is solely responsible in demonstrating that a development and design is suitable for the site.
3. All site plans are to be designed considering typical business operations. For example, curb returns should be designed to accommodate large trucks that are used for deliveries.
4. The path of design vehicles entering and exiting the site from/to respective lanes without encroaching into opposing traffic flows is required. Movements within the site to the loading area is also required to be identified on the site plan.
5. All business operations must be contained entirely within the site (loading and unloading of passengers and/or merchandise, garbage collection, parking, etc.), without adversely affecting road operations. All drivers must enter and exit the site in a forward direction. Use of the road allowance for movements, such as reversing is not acceptable.
6. All curb radii are to be contained entirely within the projected property limits of the property. Driveways are to be offset accordingly.

* Refer to Sections 4.1 & 4.6

DIAGRAM NOT TO SCALE
FOR DEMONSTRATION
PURPOSES ONLY

NiagaraFalls CANADA

MUNICIPAL WORKS
TRAFFIC & PARKING SERVICES

Commercial Development Site Plan
Minimum Requirements for Driveway Design

DISABLED PARKING
SIGN SPECIFICATIONS

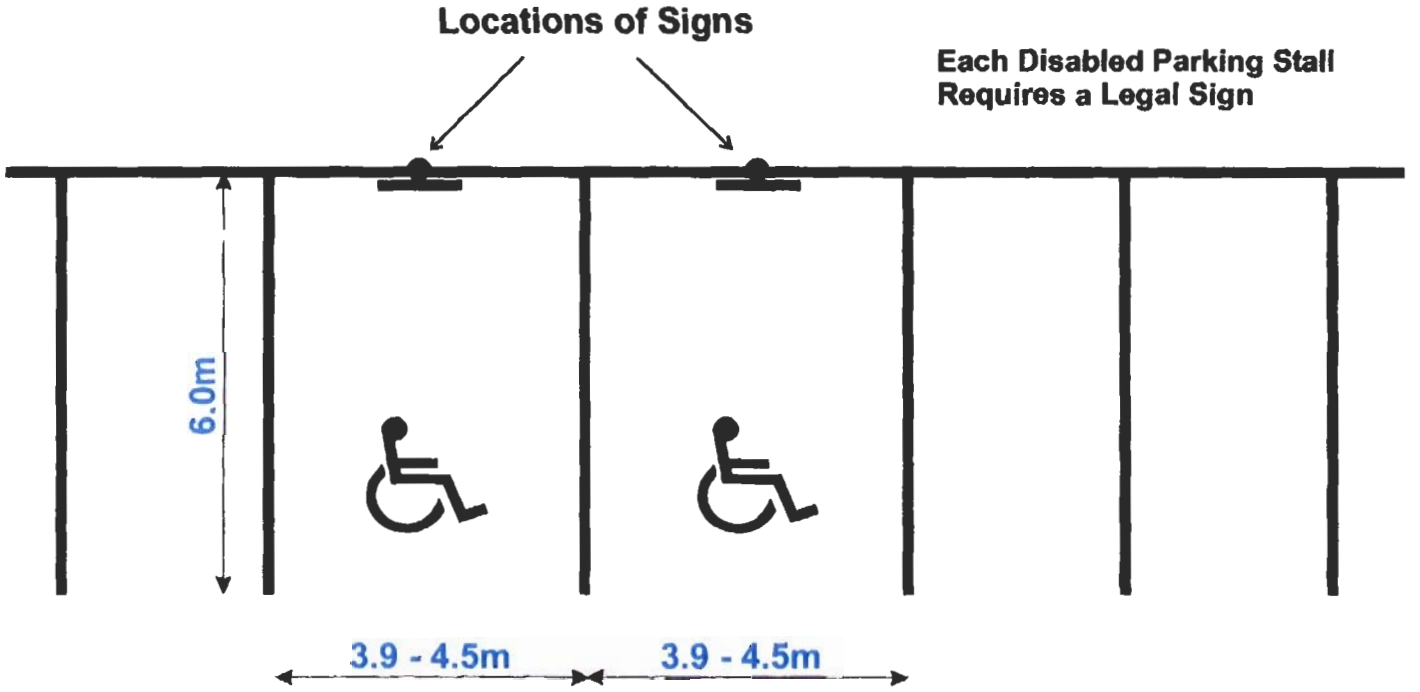
No Parking Symbol : BLACK LETTER "P", LEGEND, AND BORDER
2 cm RED REFL. ANNULAR BAND
1.5 cm RED REFL. INTERDICTORY STROKE
WHITE REFL. BACKGROUND

Disabled Symbol : BLUE REFL. BACKGROUND
WHITE REFL. SYMBOL AND BORDER

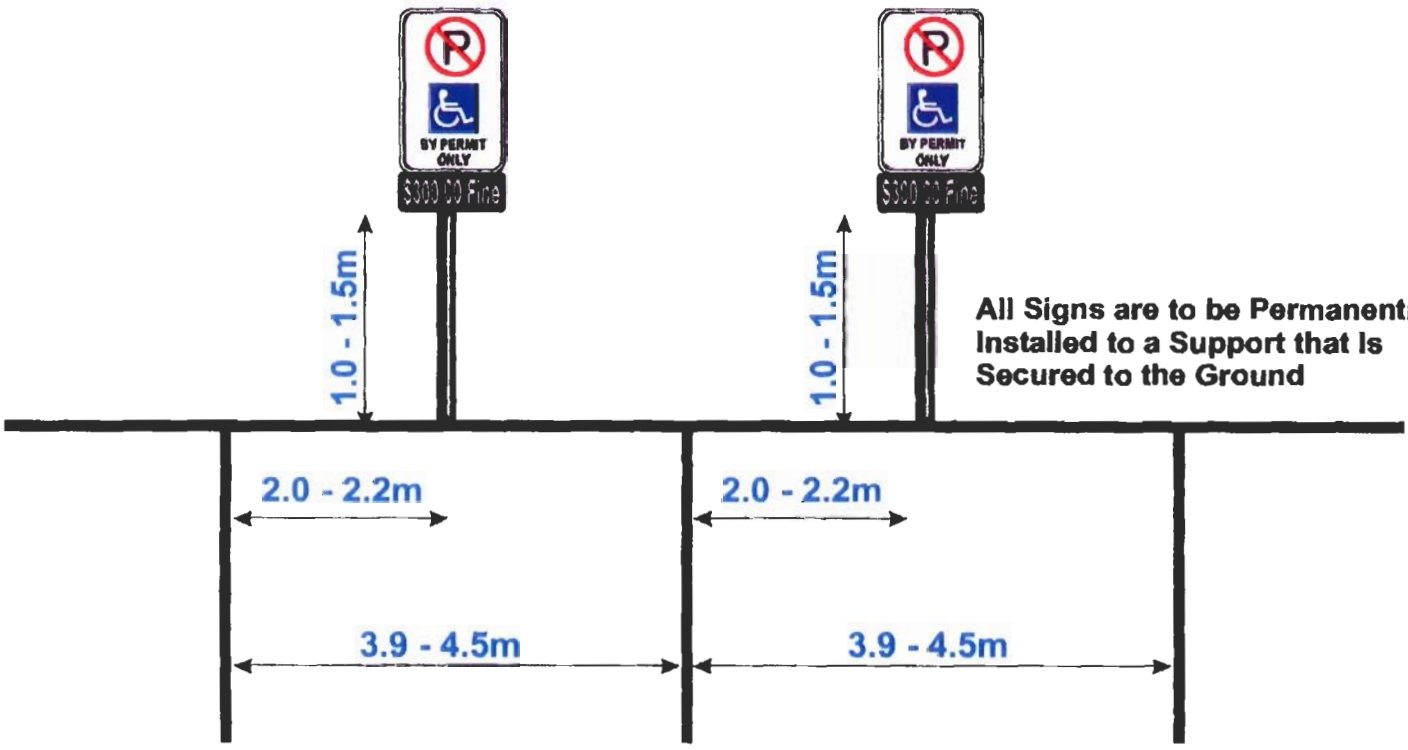
(30x45) cm

(30x15) cm

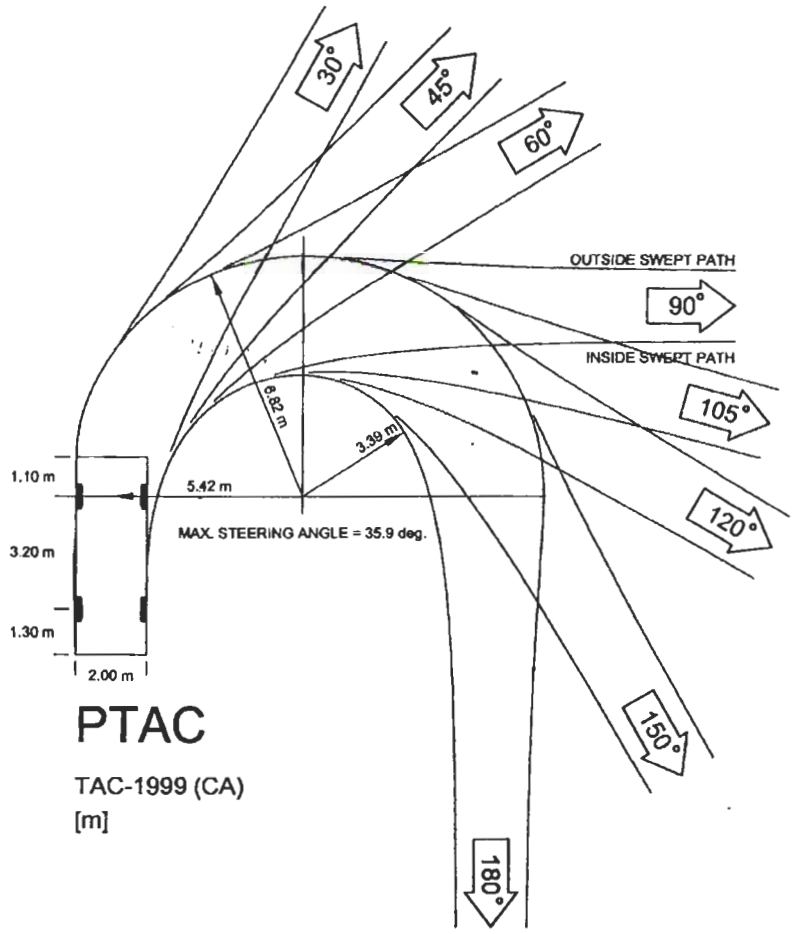
DISABLED PARKING SPACES
SIGNS AND MARKINGS



All Pavement Markings Associate with Disabled Parking Stalls Are to be White in Colour



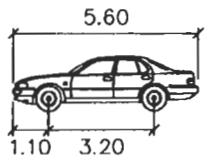
All Signs are to be Permanently Installed to a Support that Is Secured to the Ground



PTAC

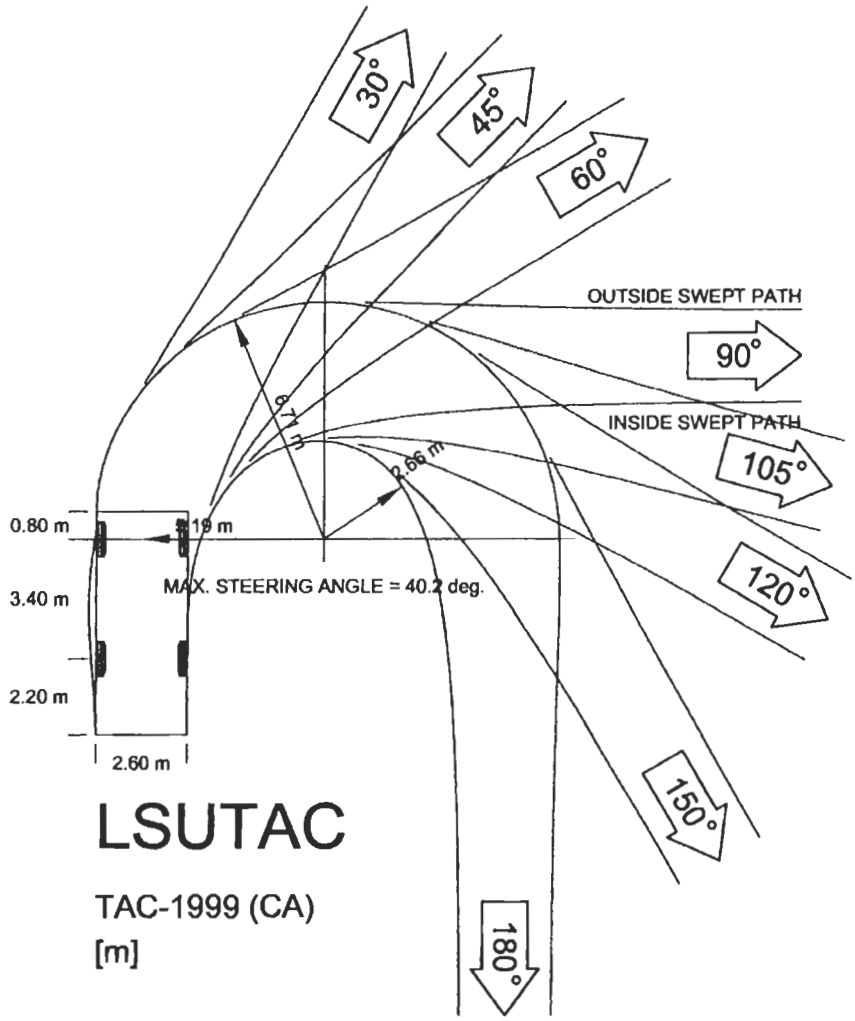
TAC-1999 (CA)

[m]



PTAC	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.00
Steering Angle	: 36.21

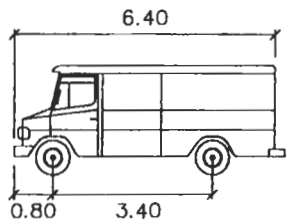
SCALE 1:200



LSUTAC

TAC-1999 (CA)

[m]



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Track	: 2.60
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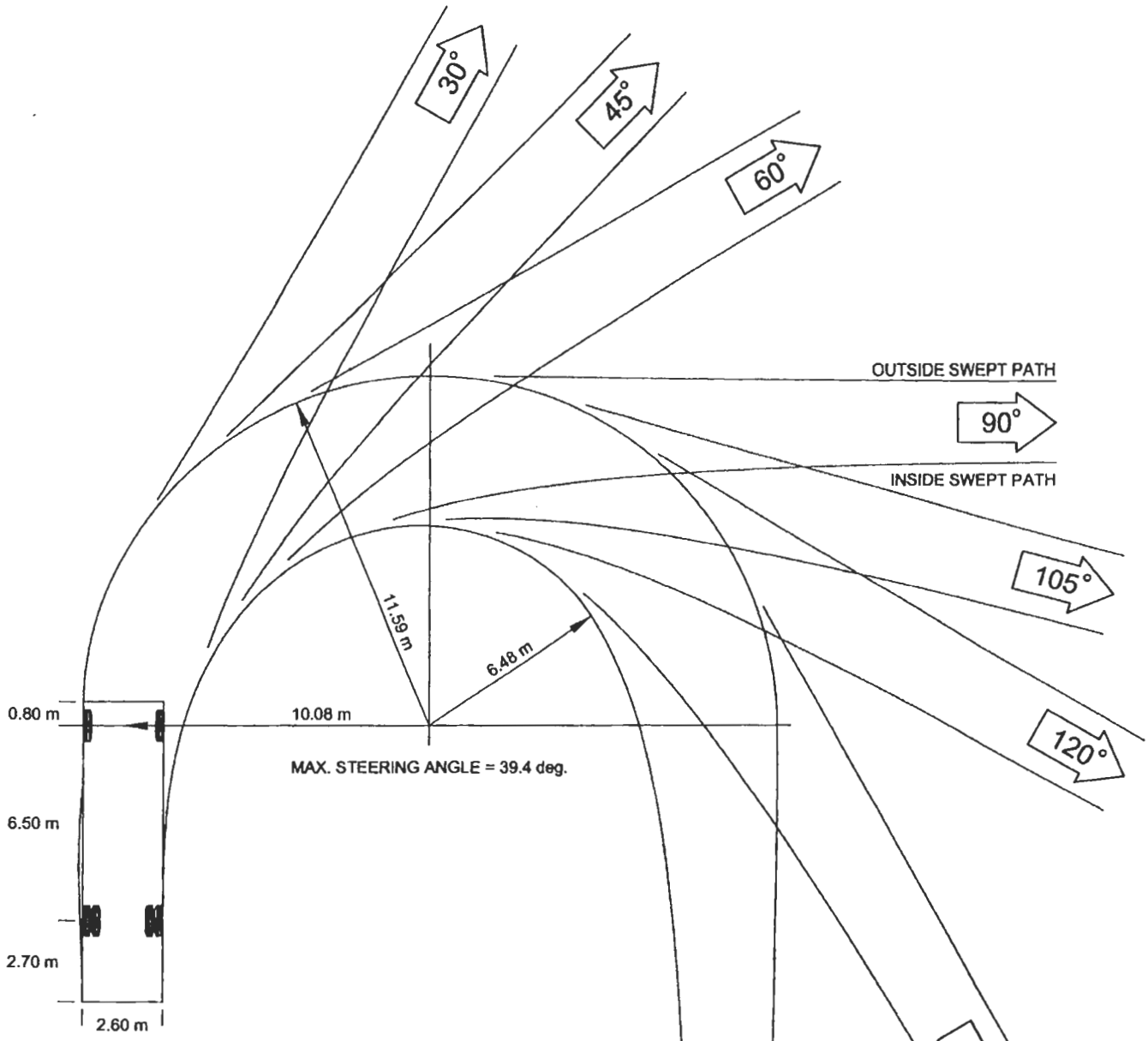
Steering Angle	: 40.88

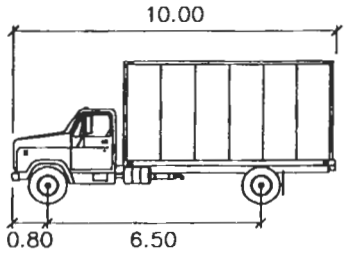
SCALE 1:200



MSUTAC

TAC-1999 (CA)

[m]



MSUTAC	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.00
Steering Angle	: 40.16

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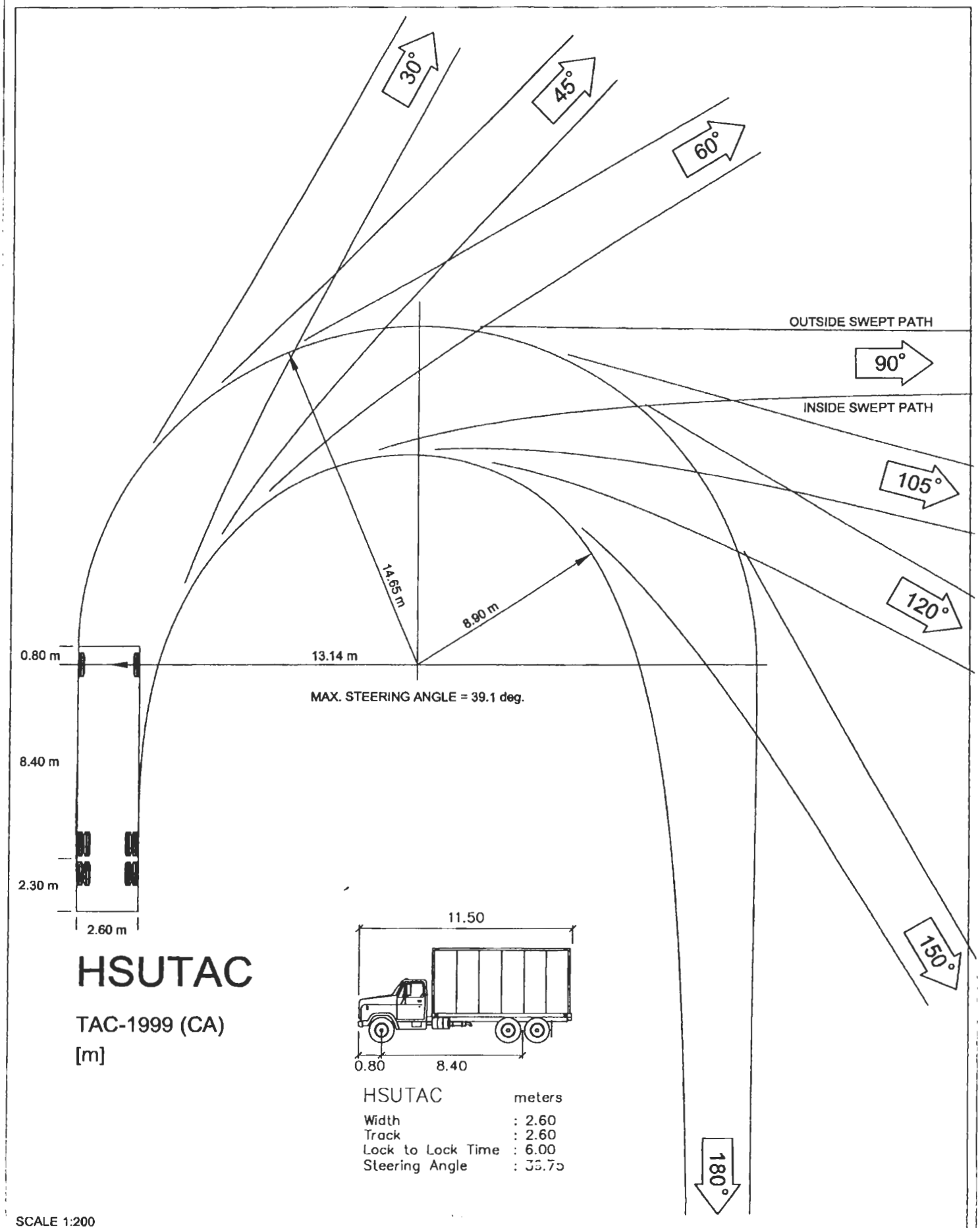


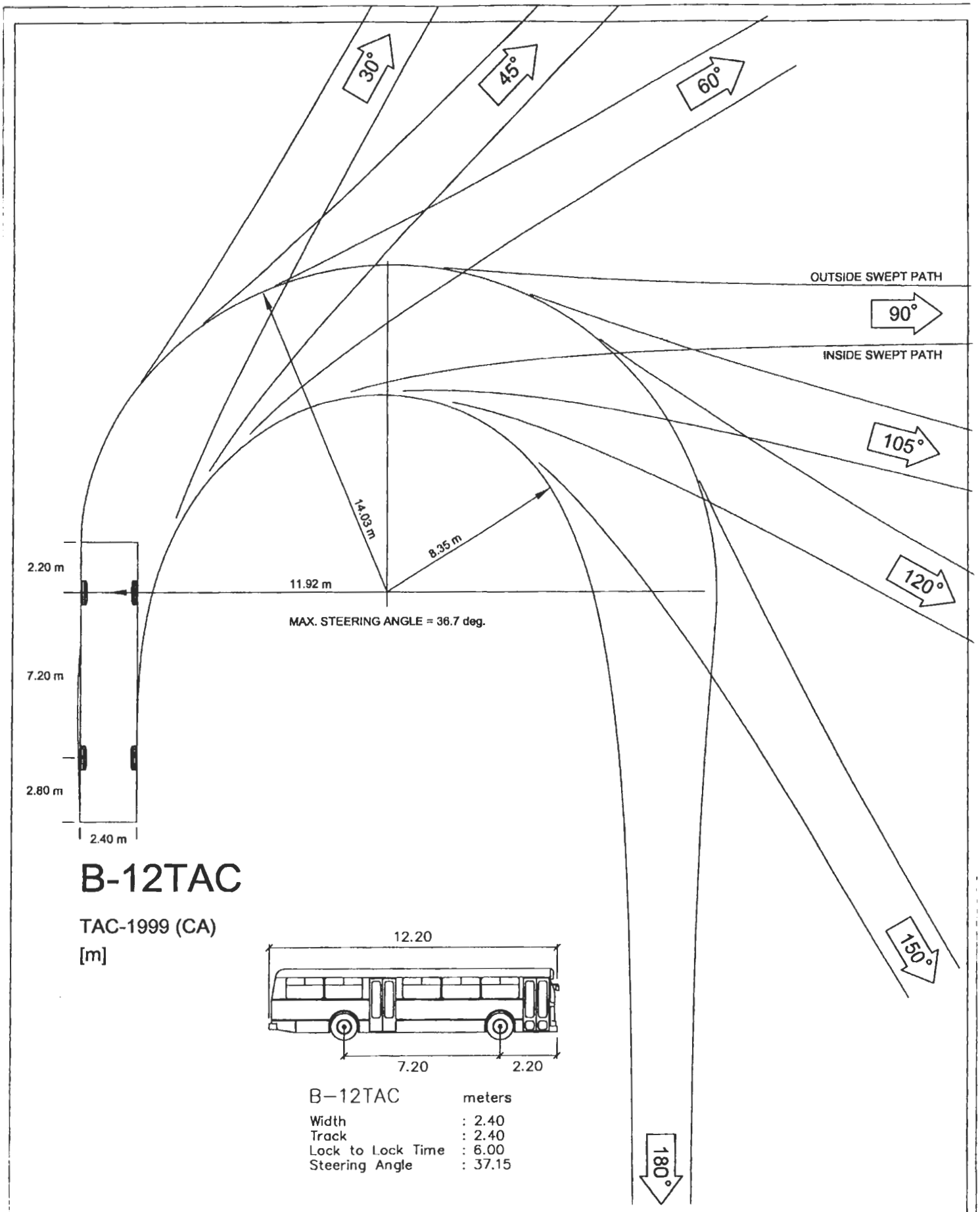
HSUTAC

TAC-1999 (CA)

[m]

HSUTAC	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.00
Steering Angle	: 39.75

SCALE 1:200

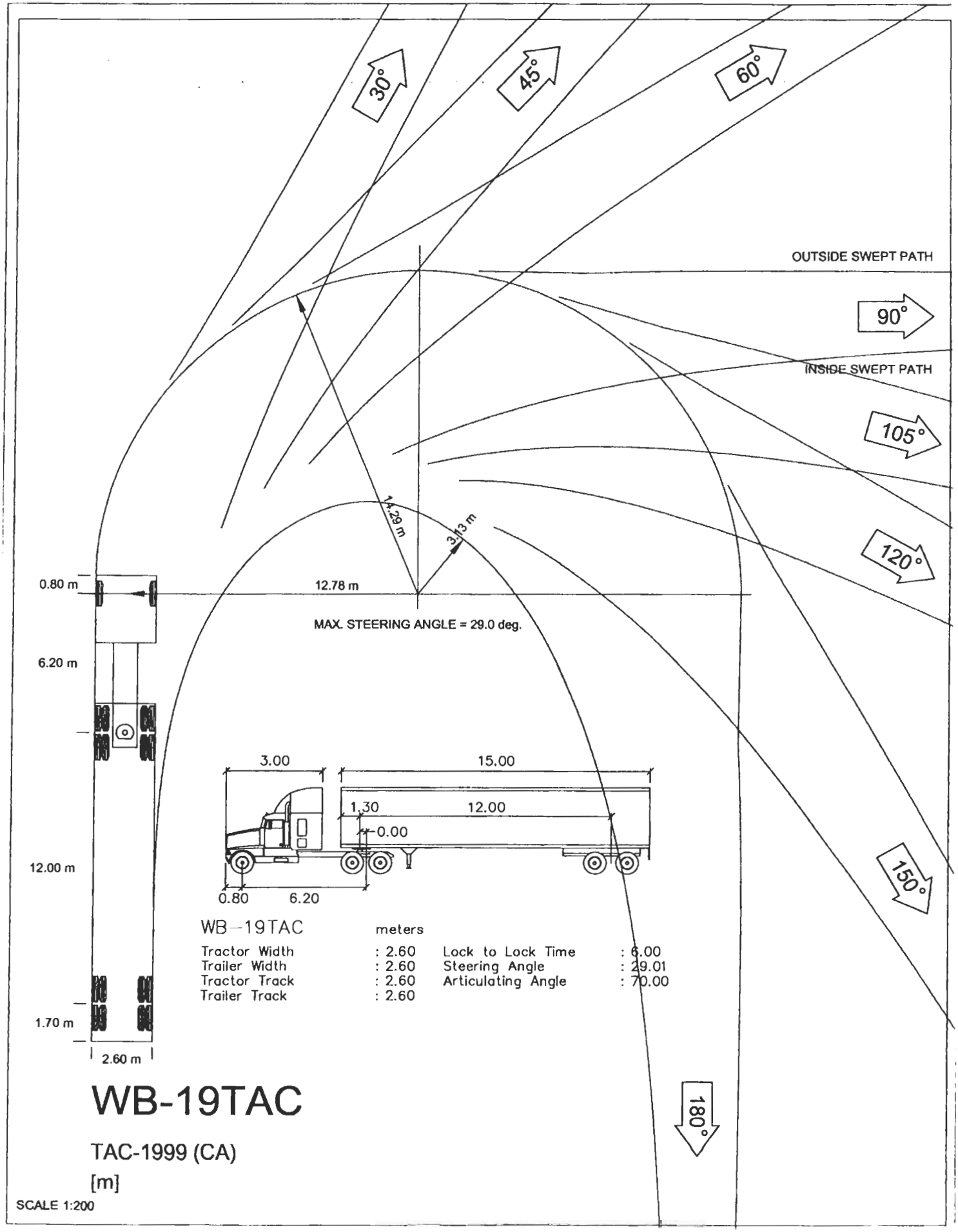


B-12TAC

TAC-1999 (CA)
[m]

B–12TAC	meters
Width	: 2.40
Track	: 2.40
Lock to Lock Time	: 6.00
Steering Angle	: 37.15

SCALE 1:200



WB—19TAC meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.00
Trailer Width	: 2.60	Steering Angle	: 29.01
Tractor Track	: 2.60	Articulating Angle	: 70.00
Trailer Track	: 2.60		

WB-19TAC

TAC-1999 (CA)

[m]

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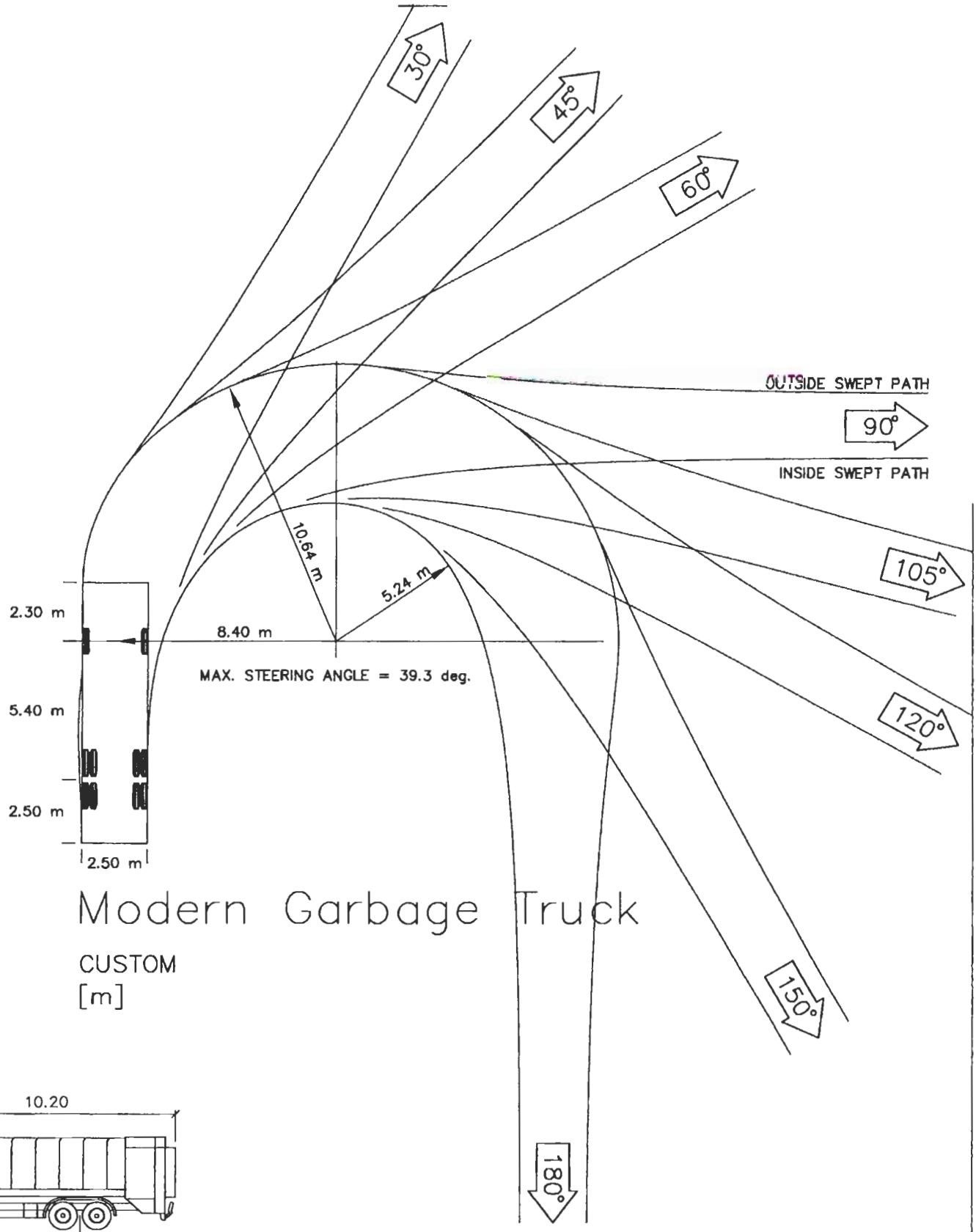


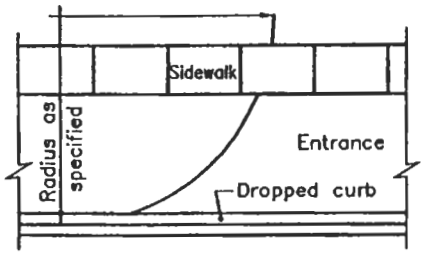
Modern Garbage Truck

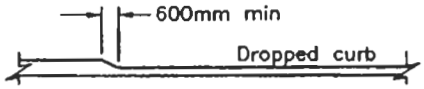
CUSTOM
[m]

Modern Garbage Truck

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.00
Steering Angle	: 40.00

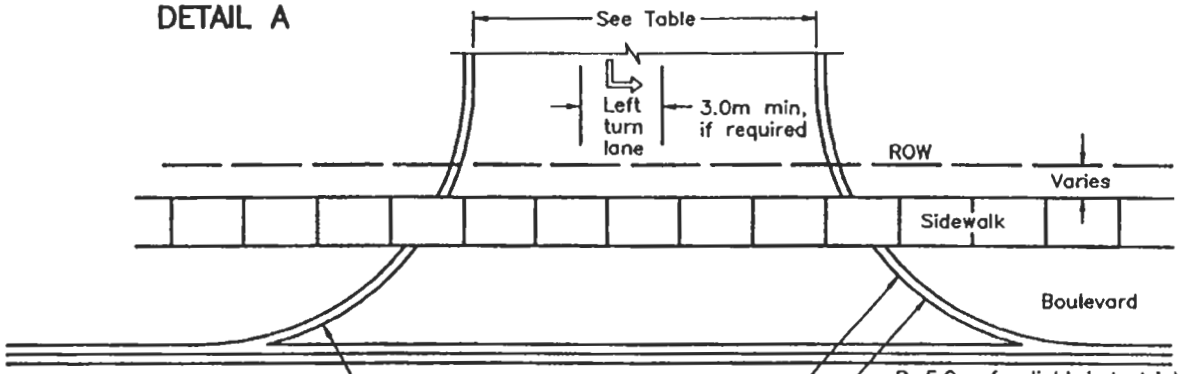
SCALE 1: 200



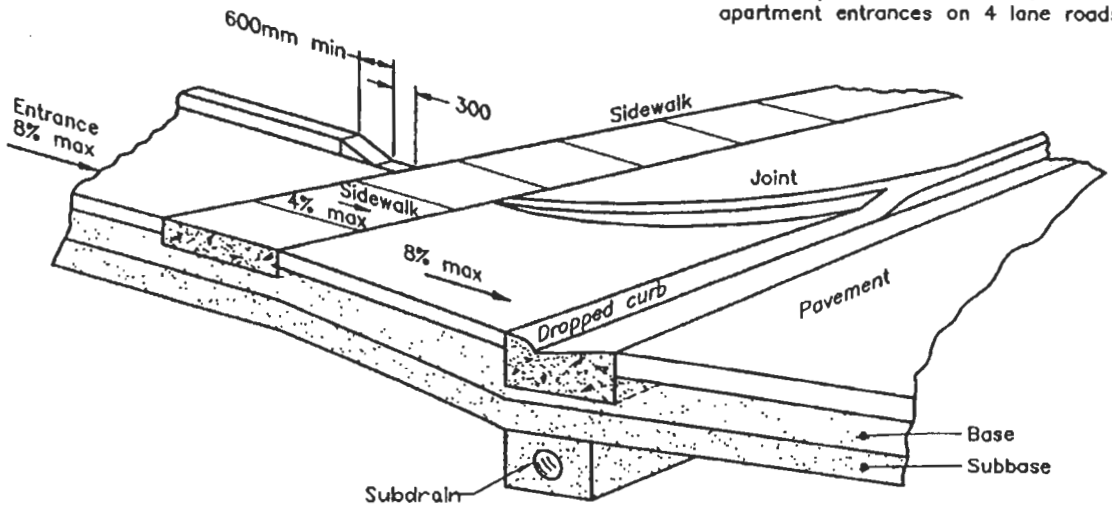


DETAIL A

DRIVEWAY DIMENSIONS						
LAND USE	WIDTH m				RADIUS m	
	One-Way		Two-Way			
	min	max	min	max	min	max
Light Industrial Commercial and Apartment	4.5	7.5	7.2	12.0	4.5	12.0
Heavy Industrial	5.0	9.0	9.0	15.0	6.0	15.0



PLAN



NOTES:

A All dimensions are in millimetres unless otherwise shown.

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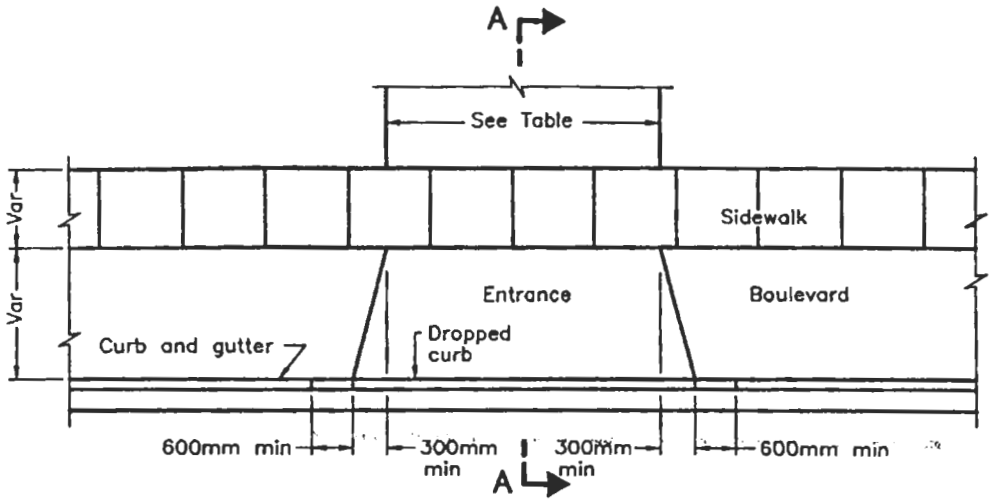
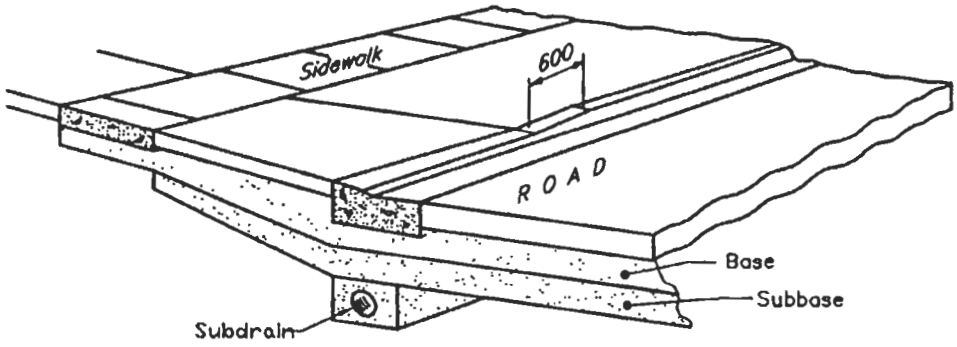
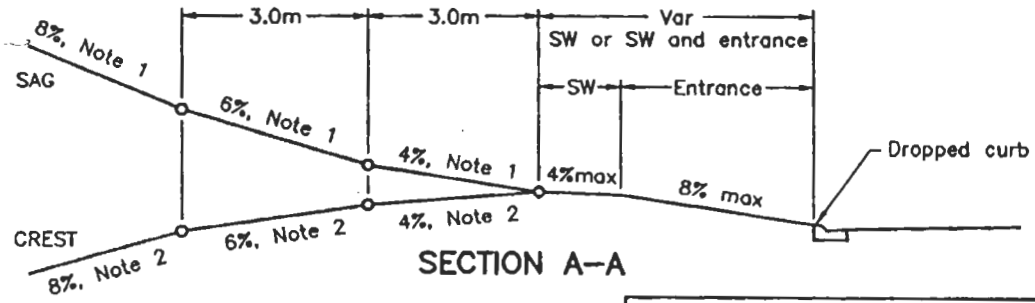
URBAN INDUSTRIAL, COMMERCIAL AND APARTMENT ENTRANCES			OPSD – 350.010



PLAN



ISOMETRIC VIEW



SECTION A–A

DRIVEWAY DIMENSIONS				
LAND USE	WIDTH m			
	Single		Double	
	min	max	min	max
Residential	3.0	4.3	6.0	7.3

NOTES:

1 Maximum upgrade shall be 10%.

2 Maximum downgrade shall be 8%.

A All dimensions are in millimetres unless otherwise shown.

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	OPSD – 351.010		