PART C

Chapter 3
Urban Design

June 2013

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Table of Contents

Figure

Part C - Chapter 3
Urban Design

3.1 Introduction

This chapter introduces key design principles for the urban design of the hard infrastructure components of road landscape infrastructure.

All infrastructure components contribute in some way to the overall visual amenity of the road landscape. Therefore careful consideration must be given throughout each phase of the planning and design process as to how these components can be made to either positively enhance road user experience, or at the very least mitigate potential negative aesthetic effects they may cause.

As a brief, general definition in the context of road infrastructure, urban design refers to addressing and coordinating the physical aspects of hard structural components under the design process. These aspects include:

- **physical form –** the actual structural/ architectural design of the component, including the addition of integrated sculptural features as aesthetic embellishment.
- **material form –** the actual type and combination of material/s used to construct the component.
- **physical arrangement –** the arrangement and interaction of components with respects to the site and other infrastructure components.
- **integrated finishes –** integrated textures, concrete colour additives, off form patterns, exposed aggregates and so on.
- **applied finishes –** applied finishes such as painted colour treatments, honed and polished concrete surfaces and so on.
- **ornamental treatments –** purely aesthetic/ artistic additions, fixings and embellishments; special case treatments for especially featured or high visibility sites.

The primary, overarching aim of road infrastructure urban design is to provide aesthetically appealing outcomes, while maintaining and even enhancing the safety and operational functionality of the component. Urban design treatments should therefore aim to fully support cost effective outcomes, in lieu of providing merely aesthetic outcomes which provide no cost benefit.

To ensure these outcomes, urban designers must work collaboratively with other project team disciplines (civil, structural, mechanical and lighting engineers for example) from the earliest concept stages of the project in order to maximise functional, cost effective outcomes incorporating a high degree of aesthetic/ amenity value whilst complying with relevant technical standards. Common infrastructure components subject to urban design consideration and which should involve inclusion of urban designers throughout the design development stages include:

- vehicular bridges and overpasses;
- tunnels;
- noise attenuation structures;
- retaining systems;
- safety barriers;
- fencing and screens;
- road lighting;
- gantries and road signs;

- road furniture;
- fauna movement devices;
- rest areas and amenity blocks;
- pedestrian/ cyclist facilities; and
- advertising signs & structures.

3.2 Urban Design Principles

The primary aim in the development of urban design outcomes is to integrate high amenity outcomes which contribute to the functionality of the infrastructure components to which they are applied.

High amenity outcomes can be achieved as much by visually integrating structural components within the surrounding landscape, as much as they can by highlighting the element as a feature element. Generally in most cases the highest road landscape amenity value can be achieved by rendering the component as visually recessive as possible, such that its visual impact 'treads' lightly on the surrounding landscape. This is particularly important in natural environments with an intrinsically high visual amenity, or urban areas with a distinct character or heritage value in which the excessive visual dominance of road infrastructure would negatively affect existing visual values and local character. Urban design treatments should therefore seek to provide outcomes which address, retain, reflect and where possible enhance the existing ***context*** of the project area. In order to deliver contextually appropriate urban design treatments, designers will first have to assess the existing visual and landscape character values of the site (Chapter 2 of Part B) and develop appropriate design solutions accordingly.

A high level of design coordination between individual structures or components should also be aimed for, such that the whole array of varied structural elements share similar physical aspects, presenting as a visually cohesive and unified suite of treatments. Ideally structural components should appear visually as a related 'family' of elements rather than an assortment of visually unrelated items, which while functional, bear no visual relationship to each other.

Designers therefore need to ensure that urban design proposals are successfully integrated with the functional requirements of the component to which it is applied, other infrastructure components and achieve a contextual relationship with the surrounding landscape.

The following general principles should be applied in the development of urban design proposals for all components of road infrastructure. Principles for the design of specific components are discussed in greater detail further in this chapter.

3.2.1 Function

3.2.1.1 Construction

Urban design treatments should adopt innovative approaches to providing functional, high amenity outcomes through:

- architectural design and detailing;
- creating visual interest through varied use of construction materials;
- incorporation of raised and recessed patterns and images within construction formwork;
- use of visually distinctive, varied textured and colour treatments;
- incorporation of integrated sculptural features and forms within structures;
- consideration of night time presence (lighting effects); and

- integration of non-structural items (including but not limited to mechanical, electrical, surveillance, signals services and other utilities components) to render them visually recessive without compromise to functional and maintenance requirements.

Consideration should also be given to the urban designs capability of adapting to planned future road corridor redevelopment (lane widening for example) and changing operational requirements such that the urban design can accommodate these changes

3.2.1.2 Safety

Urban design treatments should aim to support and promote the safety function of civil design by generally:

- addressing safety in design for construction, inspection, maintenance and operation; considerations should include storage of equipment, parking and traffic management for construction, inspection, maintenance and operation;
- promote the legibility of the road landscape for road users, minimising risk of road user distraction by limiting unnecessary visual intrusion upon the road environment and conflict with regulatory signs and signals;
- promote visually recessive treatments and an uncluttered road environment;
- address risk of light reflection through use of reflective and high gloss finishes, particularly for morning and afternoon conditions where sun is low in the sky;
- address risk of excessive light glare and shadowing from illumination sources;
- limit outcomes which promote unauthorised access to structures (climbing); incorporate locks and restricted access measures as necessary to prevent unauthorised use and removal;
- limit refuge and roosting opportunities for animals that may become road hazards; and
- incorporate CPTED principles (Chapter 6 of Part C).

3.2.1.3 Maintenance

Urban design treatments and elements must:

- be of durable and robust construction and finish in accordance with Departmental material specifications;
- be weatherproof and ultra violet ray resistant;
- be designed to be self cleaning, free draining and resistant to dust and chalk adherence and minimise potential for chemical, dirt and mould staining;
- ensure detailing and integration of elements minimises potential for the creation of litter traps;
- promote resistance to damage, vandalism, unauthorised use and removal; and
- promote ease of cleaning and be fully accessible and responsive to maintenance activities, including mechanical cleaning procedures.

Integrate anti-graffiti management strategies with consideration given to:

- applied exterior quality acrylic paint as a sacrificial coating for all structures to support current Departmental graffiti management strategy which is to reactively paint over affected areas with reparative, paint coatings;
- inclusion of regular jointing or other design feature which effectively segments large flat areas into a patchwork of smaller areas that are easier to paint out under reparative operations; these should be incorporated to a minimum 3m height of the applied element as this typically represents the height most available to vandal attack;

- proprietary brand anti-graffiti paint coatings may be used on bridge structures only (as required by the Department's Structures Branch) Note: it is permissible to apply suitable anti-graffiti coatings over initial colour paint coat if required for the urban design treatment of bridge structures; and
- deeply and widely ribbed recesses or highly textured finishes to disrupt plain surface areas and render less attractive to vandals.

Where colour treatment is proposed for road structures, it shall be achieved through painted finish only:

- paint colours shall be limited to the *Colorbond TM* colour range for consistency and to assist in current Departmental graffiti management strategies;
- coloured concrete finishes (integrated cement additives/oxides) are permitted on pathways and street furniture elements only;
- colouration and surface finish shall mitigate negative visual impact of dirt, staining and adhesion of other pollutants; and
- paints must be commercial grade, exterior quality, acrylic paint with a with a minimum 10 year warranty on finishes; all finishing, pre-treatment and coating works shall be specified and applied in manner not to void manufacturers warranty.

3.2.2 Context

Designers will need to determine early in the design phase whether proposed urban design components shall be treated as either recessive elements that blend in with the surrounding environment or are rendered as highly visible, featured structures that impose themselves as dominant features within the road environment.

3.2.2.1 Integration

Typically for the majority of cases, structures should be designed, arranged and treated / finished to achieve a recessive visual presence within the road landscape, blending into the existing visual background as much as possible. Structural urban design should seek to provide outcomes that:

- are simple, refined and without unnecessary, non-functional embellishment;
- are balanced in terms of scale and mass with respects to existing natural features and urban building forms;
- respond to and are easily legible when viewed under conditions of the speed environment;
- responsive to local context (architectural themes, colours, visual and heritage values for instance) and complementary of existing natural / built environment character to assist in physically and visually integrating them within the locality; and
- mitigate visual obstruction and clutter of views within and out of the road corridor to the broader road landscape; particular care should be taken with respects to long range vistas and views of high visual value.

3.2.2.2 Feature Treatment

More intensive urban design treatment of structures as an attempt to promote visual prominence, should be limited to high visibility and low speed environment locations where a greater level of road user attention is required or desired; for example at interchanges, junctions, bridge underpasses, linkages to urban areas and extensive sections of retaining and noise walls that cannot be effectively screened by landscape treatment. In such cases the urban design should enhance and develop a distinctive character for these locations to highlight its significance (as a gateway, journey marker, landmark, node and so on) within the road network;

More featured urban design treatment should seek to create an identifiable character for project infrastructure, reflective if ambient conditions and context. Components should be easily recognised as a suite, or group of unified elements, utilising a consistently applied palette of:

- architectural / engineering / sculptural form;
- material/s construction;
- colours and finishes;
- textures, patterns and off form work;
- detailing; and
- urban art elements.

3.2.2.3 Murals

Wall murals have traditionally been used as both a means of integrating local themes within roads infrastructure and minimising graffiti vandalism. However murals are to be avoided as their typically literal representation of local themes is at odds with providing simple, refined treatments appropriate to the scale, speed and significance of the State Controlled Road network. Select use of murals may be considered in locations and on infrastructure which is not visible from the road corridor (for instance, rear side of noise fences facing community areas, pedestrian areas (particularly underpasses) or any other low visibility location area unseen from major motorways), however mural themes will require negotiation and approval from TMR, as per Chapter 5 of the Departments *Road Traffic Noise Management: Code of Practice*.

3.3 Urban Design of Infrastructure Components

This section briefly introduces aesthetic urban design considerations for each of the main infrastructure components listed at the head of this chapter. A broader and more detailed range of design criteria and requirements (with respects to safety, maintenance for example) are detailed in Appendix 5. These guidelines also include a comprehensive list of Departmental, national State Roads Authority and national design standards that should be consulted in the design development of each component type. Project specific landscape and urban design briefs may also detail requirements additional to these criteria that will need to be addressed throughout the design process.

3.3.1 Vehicle Bridges and Overpasses

Bridges and overpasses often present the most visually striking constructed element within the road landscape setting due to their typically elevated position. They often present as strong, visual focal points when viewed from within the corridor as well as from external vantage points, therefore addressing the aesthetic value of bridges is extremely important to delivering high visual amenity outcomes.

Bridges can provide distinctive character and identity value within the road network when effectively enhanced with urban design treatments, with bridge parapets, piers, headstocks, safety screens and abutment walls each presenting significant opportunities for urban design enhancement.

Care should generally be taken to minimise the visual impact of bridge structures by minimising apparent scale, weight and mass of the structure and ensuring a proportionally balanced and integrated relationship between each of the structural elements. Bridge design should aim to:

- emphasise a superstructure (deck and parapets) that presents smooth, clean lines and has a minimal structural depth promoting a slender, lightweight appearance;

- reduce the number of supporting elements (piers) and visual intrusion by maximising spans lengths between to greatest extent possible;
- prioritise open abutment treatments (spill through abutments), particularly in rural and natural settings to promote a more open, visually permeable structure;
- generally minimise the structural scale and mass of each structural element to render the bridge as visually recessive as possible; and
- incorporate contextually appropriate design features (slender parapets, tapered piers, light colouration and so on) such that bridge structures appear embedded and visually recessive within the landscape rather than imposed upon it (Figure C3-1 and Figure C3-2).

Figure C3-1: Bridge parapets incorporating urban design treatment

Figure C3-2: Tapered and textured piers create a visually recessive structure within the road landscape

3.3.2 Tunnels

Tunnel portals, canopies and trough walls provide ample opportunities for visual enhancement through urban design detailing (Figure C3-3). Tunnels create a natural arrival point and threshold experience between aboveground and subterranean road environments, natural and artificial lighting & open and closed views, which urban design treatments should aim to promote and enhance. Alternative, contextually appropriate solutions will be required for tunnels in urban and natural environments; simple, recessive portal design expressing the internal tunnel profile being moist appropriate in natural areas, while more architecturally detailed portal and canopy design may be considered in urban areas. Tunnel urban design should seek to:

- enhance the gateway/ threshold experience through detailed portal, canopy and trough wall design;
- increase intensity of the urban design treatment as drivers approach the portal entrance;
- integrate light coloured, higher gloss finishes to internal skin walls to promote light reflection and brighter internal carriageways; and
- recessive (darker) colour treatment for structural walls and internal fixings such that these blend into the visual background.

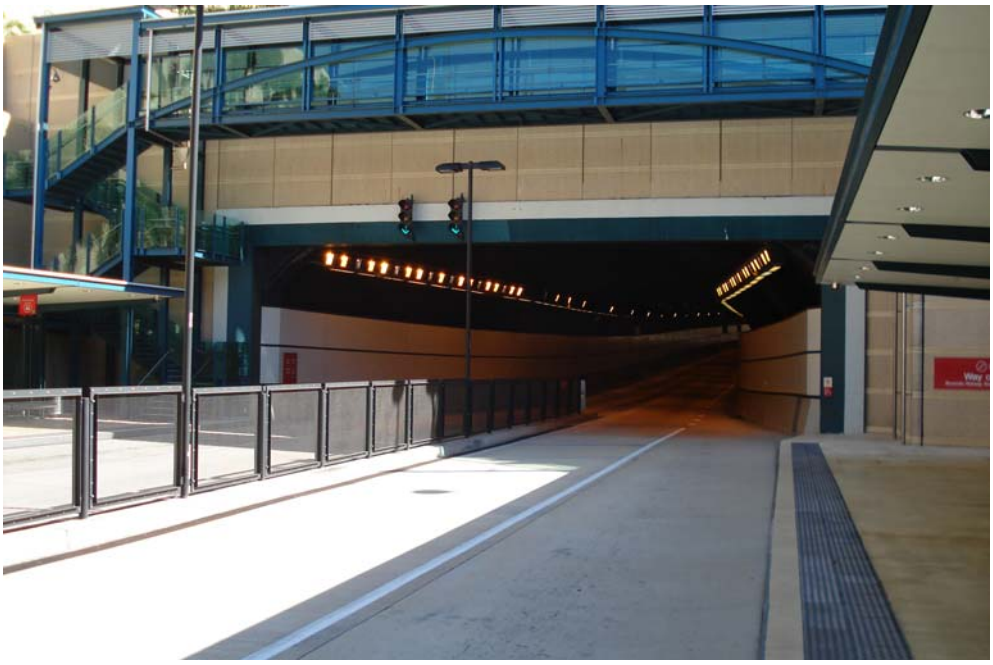

Figure C3-3: A functional and aesthetic tunnel portal through colour and material selection

3.3.3 Noise Attenuation Structures

Noise attenuation structures (including earth mounds and barriers/ fences), are designed primarily to mitigate traffic noise levels generated on roadways and transport systems to adjoining receptors (residences, community facilities, schools and so on). Noise structures also perform a secondary role in preventing unauthorised access into transport corridors, and their layout design is typically coordinated with boundary security fencing to prevent trespass into transport corridors.

Noise structures may be integrated with earth mounding to effectively diminishing the overall height (and cost) of the wall structure and promote a softer landscape approach to noise mitigation. Mounding can support vegetation to screen fencing and integrate the entire noise attenuation structure within the landscape, delivering enhanced road landscape amenity outcomes.

More than any other component of road infrastructure, noise structures can have the greatest effect on road amenity, due to the typically long distances they are required to be installed along the length of the corridor. This is particularly the case where corridor width constraints prevent the planting of an effective vegetation screen between the walls and the carriageway. Therefore the layout, selection (that is earth mounding vs. structure vs. mounding & structure combination), design, material selection and finish of noise attenuation structures is often critical to promoting high value road amenity outcomes. The aesthetic design quality of noise attenuation structures can be visually enhanced through effective urban design solutions, providing enhanced visual experience for drivers and delivering an important part of community infrastructure. Responsive noise barrier design should aim to provide a practical design layout and selection of materials that are both visually stimulating and appropriate to the local landscape setting.

3.3.3.1 Noise Barriers/ Fencing and Earth Mounding

Where available corridor width allows, earth mounding (either or on its own in conjunction with noise fencing) may be the most suitable method of noise attenuation as it can support a number of functions. Mounds assist in visual screening when vegetated and direct surface drainage to required destinations. It is preferable that the landform of mounding integrates with existing surrounding land profiles, avoids regular linear forms and incorporates rounded and undulating shapes which vary in height and width. Mounding design should also support road drainage requirements and avoid localised ponding and runoff. Mounds should support vegetation treatment of suitable plant species reflective of the surrounding landscape character to soften the roadside environment and integrate noise attenuation structures into the local environment (Figure C3-4). Planting media is important to apply on the top surface of compacted fill material in the earth mounds, to assist in root penetration for successful growth and establishment of the plants.

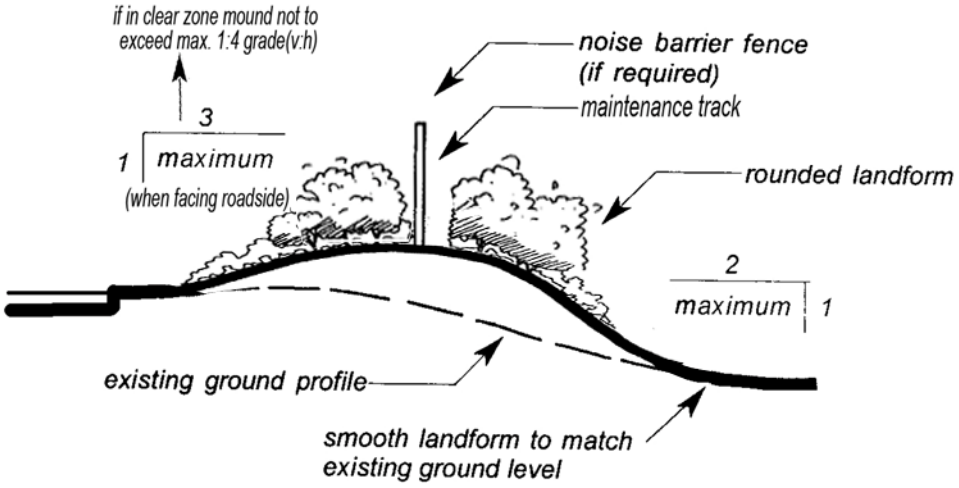

Figure C3-4: A typical cross section of an earth mound

3.3.3.2 Noise Barriers/ Fences

Due to cost considerations, standard off the shelf type noise fences are used to attenuate noise along extensive stretches of road corridor. Standard fences are often uniform in appearance across large, straight and continuous sections of the corridor and at risk of creating visual monotony and negative visual amenity as they have minimal intrinsic aesthetic value. However, without modification to the standard panel type, the often harsh visual effects of these fences can be mitigated through effective design responses.

Techniques for enhancing the aesthetic appearance of standard type noise fences include:

- reflecting the smooth, even geometry of the road design in the vertical and horizontal alignment of fencing sections; top lines of fencing should be flat and even, complementing the vertical geometry of the road as much as practicable, with the horizontal (plan) layout wall running perfectly parallel to the road alignment;
- staggered or stepped (Figure C3-5) wall alignments should only be used where required to accommodate natural undulating landforms, retain existing environmental features or in order to create specific visual interest relating to the overall urban design; this most practicable in natural areas with a highly undulating landform and where retention of roadside vegetation may be an issue, however awkward or unbalanced transitions are to be avoided;
- incorporate some means of end treatment which helps integrate the terminating wall within the surrounding urban or natural setting;
- aligning horizontal panel joints between panels in a fence to present a neat modular arrangement (Figure C3-7);
- consideration to the use of transparent panelling in select sections in order to retain key view-sheds of high visual amenity out of the corridor;
- providing screen planting along each side of the barrier to reduce the apparent height and visual impact of fences (Figure C3-6); and
- treating both sides with a simple, context sensitive colour scheme for improved visual amenity.

Figure C3-5: A stepped wall generating visual interest and views to landscape beyond

Where buffer planting to the frontage of fences cannot be achieved, these are typically are more susceptible to vandalism. Vegetation buffering of large exposed areas of fences with planting can assist in reducing opportunities for and incidence of graffiti, as it restricts access thereby acting as a deterrent. Vegetation buffering will also help screen graffiti damage that does occur, reducing its visual prominence and the need to repair under maintenance. Therefore a dense screen of vegetation to each side of noise fences should be prioritised to the greatest extent possible for improved aesthetic outcomes and to mitigate maintenance intervention.

Figure C3-6: Buffer planting protecting noise barrier from vandalism and graffiti

3.3.3.3 Purpose Designed Noise Fences

Purpose designed noise fences may be required in order to integrate noise fences within the overall urban design on a particular project, in order to fit within the suite or family of design elements discussed above under general principles. These should typically only be used in high visibility locations (unable to be effectively screened) and slower speed environments (where they will be viewed longer by drivers) where the visual impact they create is important to enhancing the urban design themes of the project or character of the area.

Purpose designed noise fences provide significant opportunities to utilise and develop distinctive designs, features and finishes. Due to their potentially significant expense, this type of design response is more suited to high profile locations; that is, feature areas such as gateways, key entries and landmarks within urban settings.

Purpose designed noise fences may include the following depending on location and design intent:

- incorporation of patterning and textural finishes; however these should promote bold imagery and minimise complex detailing, particularly in high speed environments where excessive detail will be visually ineffective and potentially distracting;
- complimentary planting within or adjoining the barrier to compliment its visual appearance; for example, shape or form;
- feature painted panels which provide areas of visual contrast; for example, colour treatments;
- mixture or variation of materials and colour for visual interest (Figure C3-7); and
- incorporate transparent panels to reduce adverse visual impacts at significant vantage points (for example; retain views with high scenic value or views from bridges to major rivers).

Figure C3-7: Colour and pattern in conjunction with material selection used in noise barriers design to create visual interest and express corridor themes

Careful consideration should be given to the use of transparent panelling due to the additional capital cost and as associated maintenance issues (shorter design life and breakage damage). Transparent panels should only be used where:

- retaining a distance view or portion of a view is warranted due to its level of visual significance and community value;
- panels function effectively as a CPTED measure by improving surveillance and personal security at vulnerable locations;
- contextually appropriate, in terms of compatibility with adjoining panel materials;
- set back appropriately from the carriageway to avoid unnecessary access and vandalism opportunities, particularly in low speed environments; and
- required to lower apparent or perceived height of the overall fence layout or reduce shadow line to an adjoining property.

Refer to Chapter 5 of the Departments *Road Traffic Noise Management: Code of Practice* for more detailed information relating to integrated noise barrier design.

3.3.4 Retaining Systems

Retaining systems are available in many forms depending on their location and function, and utilise different construction methods.

Like noise walls, retaining walls can be significantly enhanced through appropriate urban design detailing, with treatment selection determined by the sites context, the visual significance of the walls location and relationship to other components of urban design infrastructure (Figure C3-8 and Figure C3-9). Selected treatments should be based on both the physical constraints of the retaining system (size and structural depth of wall panels for instance will constrain type of recessed formwork possible) and visual themes being developed. Concrete retaining systems provide the most opportunity for visual enhancement and detailing.

As a general rule, shotcreting is to be avoided as a retaining system (particularly in urban and high visibility areas) due to the typically, negative visual amenity of the treatment. Where required (and unavoidable for geotechnical reasons and or cost), the selected colour of the shotcrete should be visually compatible with the other palette of colours used within adjoining design components.

Textures and finishes should aim to be as naturalistic as possible, and make use of surrounding forms and shapes to ensure visual compatibility with the surrounding existing landscape setting.

Figure C3-8: Colour and pattern in conjunction with three dimensional art used in retaining wall design to create visual interest and express corridor themes

Figure C3-9: Retained soil system wall panels incorporating contextually sensitive urban design detailing and colour palette

3.3.5 Safety Barriers

Barriers are essential within transport infrastructure to improve road user safety for users. There is little potential for urban design treatment of safety barriers, however barrier selection and integration with other components of infrastructure can yield improved road amenity outcomes. Barrier design considerations include:

- use of select barrier types (open rope barriers in lieu of full height concrete barriers for instance) to promote visual permeability across and out of the corridor where required, especially to allow views to areas of high visual significance;
- coordinate with vegetation treatments behind the barrier such that vegetation is visible above the top line of the barrier and contributes positively towards road amenity;
- physically and visually integrate barriers where required against retaining walls and bridge piers such that the combination of components reads visually as a single related structure; and
- consider maintenance access requirements behind barriers.

Concrete barriers provide limited opportunities for incorporating urban design detailing such as colouration of the inside of barriers to bridges to integrate with associated bridge parapet treatments or central median barriers built around colour finished bridge piers. However this form of treatment should be simple, visually recessive and strictly limited to critical barrier sections required to integrate within the overall urban design of a structure.

3.3.6 Fencing and Screens

Fencing and screen (anti-glare) design should seek to promote visually recessive outcomes such that the structures blend harmoniously into the background landscape with road users barely aware of them. To this end, fencing and screens should be of a type that minimises visual obstruction (minimal material construction, posts cross bars and so on), promotes visual permeability promote (open wire mesh, perforated steel types) with colouration that blends into ambient conditions. Black colour finish (posts and mesh) is the preferred Departmental colour standard for achieving visually recessive outcomes for fencing and screens (Figure C3-10). In the case of fauna fencing, the fauna exclusion strip should also be black on the roadside alignment facing side and any other side that may be seen from the road where the fence alignment changes.

Fencing used in prominent urban locations should exhibit a higher level of aesthetic design quality to improve its long term visual appearance. Where pedestrian and/or cyclist activity is more focused in areas adjoining fencing, it should also be able to withstand a higher level of wear and tear. Where possible, vegetation should be implemented to at least one side of fencing to soften its visual appearance, particularly when used in extensive linear extents along the road corridor. However it is important that maintenance is not compromised by allowing a suitable setback to facilitate access. Safety should also be retained by ensuring that adjoining planting meets CPTED requirements. Where open style fencing is installed to an adjoining pathway, planting used at the interface with the fence should be a compact species so as not to overhang and cause a hindrance to pedestrian and/or cyclist movement.

Ensure coordination with security fencing, fauna fencing and noise barrier design to provide cost effective access exclusion.

Figure C3-10: Black fencing visually blends into the landscape background

3.3.7 Road Lighting

While there is limited scope for urban design treatment of road lighting components, amenity improvements can be achieved through careful consideration of their placement to avoid visual clutter and imposing on existing views. To this end, the number of lighting poles should be minimised to the least number required for operational functionality. Strategies for reducing the overall number of lighting poles include combining double luminaires in central medians and integrating lighting fixtures to structures in lieu of separate individual poles.

Road landscape treatments need to be integrated with lighting also to ensure appropriate vegetation setbacks to prevent unwanted shadowing and support maintenance access.

3.3.8 Gantries and Road Signs

As with road lighting, sign placement should seek to minimise visual clutter and disruption of views. Avoid placement blocking scenic views and where possible locate below the skyline with a backdrop of vegetation so that the sign does not present to starkly. The number of elements should be reduced by combining signs in the same supporting structure where possible, and attaching to other structures (bridges for instance) where feasible. Careful consideration should also be given to placement of gantries to ensure that these do not overly dominate the road landscape and disrupt existing high value views from the road corridor.

Landscape design needs to consider sign locations to ensure sufficient vegetation setbacks and maintenance of sight lines to signs throughout the operational life of the road.

3.3.9 Road Furniture

General road furniture should be designed to be as visually recessive as possible and integrated with landscape treatments to blend into the visual background. Again, visual clutter generated by a multitude of elements should be reduced and placement to avoid disrupting existing views. Maintenance access requirements are to be addressed in the surrounding landscape design.

3.3.10 Fauna Movement Devices

Fauna movement devices play an important role within the road landscape by facilitating safe fauna movement and refuge opportunities across and within road corridors, and helping to prevent road hazards and road kill through fauna exclusion fencing. Devices can be successfully installed within the road landscape through integration with road structures which provide movement opportunities (bridge underpasses and culverts for example) and the considered design of associated landscape treatments to provide habitat opportunities and support desired fauna flows (Figure C3-11).

Refer to the Departments *Fauna Sensitive Road Design Manual* for design guidelines of various types of fauna movement devices.

Figure C3-11: Fauna fencing integrated within the road landscape

3.3.11 Rest Areas and Amenity Blocks

Not only do roadside rest areas and amenity blocks play a major role in enhancing the travel experience by providing road users with convenient toilet and recreational facilities, they also contribute to road safety in providing rest opportunities to address driver fatigue.

Situated typically in rural or natural settings between urban centres, rest areas and amenity blocks should be designed sensitively with respects to the surrounding landscape, particularly where constructed in locations of high environmental value. Analysis of road use and regional visitation data will be required to ensure rest areas consider and accommodate sufficient levels of vehicle parking service for the range of vehicle types anticipated for specific routes (articulated commercial vehicles, larger domestic vehicles including caravans, trailers and campervans for example). Consideration will also have to be given to the provision of associated park furniture (bins, seating, shelters, play equipment and so on) relative to expected level of service and the maintenance requirements of the facility. Hours of operation will also need to be addressed through appropriate provision of lighting and controlled access (lockable gates, doors and so on).

Some general design criteria for rest areas include:

- use of attractive, feature landscape treatments at site entrances to highlight facilities for road users;
- incorporation of CPTED measures for safe daytime and night time use, promoting a high level of visibility and passive surveillance from the roadway and within the facility itself; site planning and facilities design shall be cognisant of site topography and existing vegetation to maximise natural surveillance;
- robust design and use of durable materials to minimise risk of vandalism damage and ongoing maintenance requirements;
- provision of a high degree of shade amenity (particularly during noon through to late afternoon) is provided, with picnic/ play facilities, amenity block entrances and car parking bays to receive particular attention; consider location of rest area facilities relative to existing site vegetation to maximise shading potential; and
- inclusion of separation/ exclusion design features (bollards and barriers for instance) as required to prevent unauthorised vehicular access into rest areas from the roadway and car park areas; large trucks should also be separated from general domestic vehicle car parking to reduce risk of traffic hazards.

3.3.12 Pedestrian and Cyclist Facilities

Pedestrian and cyclist facilities play a crucial role in facilitating and promoting alternative means of transport network connectivity. The primary strategic objectives for all pedestrian/ cyclist facilities shall be to:

- provide safe, equitable, amenable and easily navigated circulation systems functionally integrated within vehicular transport networks and linked within the local/ regional urban framework;
- support access and community connectivity across and along the transport corridors; and
- promote and facilitate alternative transport modes mitigating road traffic volumes and supporting sustainable transport technologies.

Network planning studies will need to identify existing pedestrian/ cycle networks as well as determining future needs (at local scale and possible even regional scales depending on the size and scope of the project) in order to successfully deliver strategic design outcomes. Key arrival points, routes, desire paths, user groups and destinations will all need to be assessed, supported and accommodated in circulation network design.

Consideration must also be given to the designated use of the facility early in the design process, whether the facility will be limited to single use (restricted to either pedestrians or cyclists only) or shared use (both). Corridor width constraints may determine allowable usage, setting the available path width and may also determine whether cycle facilities will have to be integrated throughout select sections as on-road lanes.

The optimisation of equitable access must also be a key design consideration, compliance with disabled access standards being a primary key result area on all projects. Compliance with standards may prove to be difficult however, given the geometric constraints encountered on many road projects, and consultation with and design verification by suitably qualified disabled access auditors may need to be coordinated on complex projects.

The design of pedestrian/ cyclist facilities will need to consider a wide variety of elements (Figure C3-12) including but not limited to:

- paths, aligned to (behind kerb) and at the same general, longitudinal gradient as roads;

- other pathways not aligned to roadways but connecting the corridor with other routes within the regional pedestrian network, along local streets and through adjacent parklands for instance and across the road corridor via underpasses and footbridges;
- cycleway/ veloway dedicated for the high speed use of bikes only;
- ramps and road crossing devices;
- surface treatment of pavements; treatments will need to comply with anti-slip standards, promote self cleaning and integrate feature treatments as necessary for improved aesthetics and functionality;
- railings and balustrades;
- tactile ground surface indicator strips and other elements required for disabled access compliance;
- traffic separation devices including barriers and bollards;
- lane/ right of way demarcation devices and treatments including signs, pavement line markings and contrast pavements;
- wayfinding and directional signs; and
- associated street furniture, shade shelters, urban design and landscape/ revegetation treatments.

Figure C3-12: Integration of pavement treatments to cycleway facilities

Due to the pedestrian scale and increased opportunities for user appreciation, recreation and interaction, a high level of landscape amenity treatment should ideally be integrated with pedestrian / cyclist facilities. Landscape treatments should aim to:

- provide a high degree of shade amenity along the route, at key nodes and rest areas for user comfort, particularly through the hottest part of the day; consideration should be given to optimising the casting of shadows from northerly to westerly aspects (Figure C3-13);
- ensure sufficient setbacks and clearance envelope (inclusive of vertical head clearance for cyclists) for user safety and does not encroach upon or risks structural damage (root damage) to pathways;
- incorporates safety sightlines (to traffic and from traffic and for CPTED considerations) design measures throughout;
- utilise as visual and physical buffers between pathways and roadways;
- screening buffers against adjacent development that may detract from the amenity and recreational values of pedestrian infrastructure a

- to create more visually distinct treatments at path entrances, user nodes, junctions and slow down points to highlight the network significance of these areas and promote speed reduction; and
- accommodate maintenance access.

Figure C3-13: High degree of shade amenity provided at cycleway facilities

3.3.12.1 Pedestrian Underpasses

Underpasses are typically installed under roadways to facilitate pedestrian connectivity across the corridor. As such underpasses are generally hidden from view from road users and provide limited scope for passive surveillance. Pedestrian underpasses therefore need to integrate CPTED measures into the design to ensure that user safety and security is maintained or at least optimised. Underpass design will also need to address an increased potential for graffiti damage as the enclosed space can help conceal vandals from sources of natural surveillance. In order to maintain surveillance and personal security at these locations, design responses will need to address:

- lengthy sightlines and visibility throughout the facility to allow users to identify potential security risks;
- integration of landscape treatments at entrances to support natural surveillance into the underpass, particularly as viewed from the roadway and adjacent premises;
- adequate lighting and bold and bright finishes to promote natural illumination;
- clear accessibility without blind corners and minimisation of concealment opportunities; and
- vandal resistant fixtures (lighting for example) and an integrated anti-graffiti strategy.

Wall murals may be considered as potential finishing treatments for the internal areas of underpasses

as these will typically be unseen from the road and traditionally play a positive graffiti management role, typically attracting less frequent vandalism damage.

3.3.12.2 Pedestrian / Cyclist Overpasses

Overpasses provide pedestrians and cyclists safe access over busy roads on footbridges and are critical to maintaining the connectivity of local pedestrian networks. These are largely used in urban areas where pedestrian and cyclist traffic volumes are higher, and are often a prominent visual feature in the road landscape. Footbridges should be visually integrated within the surrounding landscape setting and with the urban design treatment of adjacent road infrastructure. The same general urban design principles outlined for vehicular bridges apply to footbridges also, however given the pedestrian scale and use of the structure, more refined design approaches should be aimed for. Particular attention should be given to the design of safety/ throw screens and entry areas as these provide significant opportunities for urban design treatment and detailing (Figure C3-14).

Figure C3-14: Footbridge as a visual feature element within the road landscape with detailed attention to throw screen design

3.3.13 Advertising Signs and Structures

The road corridor provides an attractive prospect to commercial interests for advertising due to the large volume of road users that can be reached. The Department has separate policies and approval process with respects to the acceptance of advertising sign/ structure proposals within the state controlled corridor which are not addressed in this manual. The same general design principles as for road signs should be applied in their treatment, positioning and integration with landscape treatments.