

Appendix K

# Landscape character, visual impact assessment and urban design







## Alfords Point Road Upgrade

## Alfords Point Bridge Southern Abutment to Brushwood Drive

Landscape Character & Visual Impact  
Assessment and Urban design Report



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# Contents

- 1 Introduction ..... 1
  - 1.1 Project description ..... 1
  - 1.2 Methodology ..... 1
- 2 Landscape Character Analysis ..... 3
  - 2.1 Road transport context ..... 3
  - 2.2 Landscape context ..... 3
  - 2.3 Built and community context ..... 5
  - 2.4 Landscape Character zones..... 5
- 3 Landscape Character Impact..... 9
  - 3.1 Properties overlooking Georges River..... 9
  - 3.2 Properties facing the corridor..... 9
  - 3.3 Alfords Point Road on fill..... 9
  - 3.4 Alfords Point Road in cutting..... 9
  - 3.5 Truck inspection bay ..... 9
  - 3.6 Overall landscape character impact ..... 9
- 4 Visual Analysis ..... 11
- 5 Visual Impact Assessment ..... 13
  - 5.1 Impact upon users of Alfords Point Road ..... 13
  - 5.2 The impact upon residents whose properties fall within the visual catchment. .... 13
- 6 Urban Design Objectives And Principles ..... 16
  - 6.1 Fitting the upgrade into the existing road and landscape setting ..... 16
  - 6.2 Planting design ..... 16
  - 6.3 Improvements to off-road path..... 16
  - 6.4 Fitting the upgrade into the adjacent road network..... 16
  - 6.5 Noise barrier design..... 17
- 7 Conclusion and Recommendations ..... 18
- Appendix A - Visual Impact Assessment Viewpoints ..... App-A:1
- Appendix B - Plans and cross sections ..... App-B:1
- Appendix C - Guidelines for Landscape Character and Visual Impact assessment ..... App-C:1

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# 1 Introduction

## 1.1 Project description

Roads and Maritime Services, NSW (RMS) has recently constructed a duplication of the existing bridge across the Georges River on Alford's Point Road (completed in 2009), as well as an associated project to duplicate the bridge's northern approach road, extending 1.2 kilometres north of the bridge completed in 2011).

RMS now proposes to widen the southern approach to Alford's Point Bridge, including the provision of additional traffic lanes and replacement of a temporary shared pedestrian/cycle path with a permanent structure. Features of the proposal as shown in figure 10 on page 8 include:

- An upgrade of the existing four lane undivided road to a six lane divided carriageway for about 2.1 kilometres. Widening would be limited to the eastern side of Alford's Point Road to accommodate three lanes in each direction, and installation of a continuous concrete Type F barrier for the entire 2.1 kilometre proposal length to separate the northbound and southbound lanes.
- Widening the Alford's Point Road northbound on-ramp from Brushwood Drive for a through traffic lane to remove the merge onto Alford's Point Road and also accommodate a short bus only lane to avoid conflict with bus movements.
- Widening the Alford's Point Road southbound off-ramp to provide additional capacity and prevent queuing back onto Alford's Point Road southbound lanes.
- Realignment of the existing temporary off-road three metre shared path on the eastern side of Alford's Point Road, from the southern abutment of Alford's Point Bridge to the Aged Care Facility on Fowler Road. A type F barrier would also be installed along this length to separate the path from the southbound carriageway.
- Relocation of the existing informal truck bay to a permanent location beneath the Old Illawarra Road overbridge (900 metres south of Brushwood Drive), including permanent boundary fencing, lockable gates and lighting.
- Provision of a vehicle breakdown bay located on the southbound carriageway at approximately the location of the existing informal truck inspection bay.
- Relocation of the existing variable message sign (VMS) to approximately 300 metres south of the current location.

The *Environmental Planning and Assessment Act* 1979 requires that RMS undertakes a Review of Environmental Factors (REF) for the proposal. This

report comprises a landscape character and visual impact assessment and urban design report for the proposed road upgrade for inclusion in the REF document.

This landscape character & visual impact assessment and urban design report considers:

- The character and qualities of the existing site and surrounds.
- The significance of existing views to and from the site.
- The sensitivity of the landscape to alteration by the proposal.
- The potential for existing views into and out of the site to be affected by the proposal.
- Urban design principles and objectives which would be addressed as the design is developed to improve the design outcome for the community and traveller as well as avoid and minimise impacts.

## 1.2 Methodology

The methodology used to undertake the study is consistent with the RMS *Guidelines for Landscape Character and Visual Impact Assessment* ('the Guidelines') reproduced at Appendix C and summarised as follows:

- 1 Initial site visit for the project team to gain familiarity with the project area;
- 2 Background review of the concept design and supporting material so that the nature of the proposal may be appreciated;
- 3 Describing the area's landscape character;
- 4 Evaluating the impact of the project on the area's landscape character based on its sensitivity and the magnitude of change caused by the proposal;
- 5 Delineating the project's visual catchment;
- 6 Selecting viewpoints within the visual catchment representative of the varying site conditions and proposal configurations;
- 7 Evaluating the proposal's visual impact by comparing the sensitivity of existing viewpoints and the magnitude of impact of the proposal upon them;
- 8 In collaboration with the project team, identifying improvements to the proposal prior to its finalisation which achieve a more satisfactory visual outcome; and
- 9 Identifying design opportunities and potential methods of mitigating adverse visual impacts for consideration during the subsequent detailed design phase of the project.





Georges River National Park

Georges River

Alfords Point Bridge

Georges River National Park

Georges River National Park

Alfords Point Road

Alfords Point

Illawong

Inset: Truck Inspection Bay



10m 250m N

Figure 1 Study Area

Truck inspection bay 800m further south (see inset)



# 2 Landscape Character Analysis

## 2.1 Road transport context

Alfords Point Road and Bridge form part of the MetRoad 6 (MR6) road corridor linking the M2 Motorway in the north with the Princes Highway in the south. The study area sits immediately to the south of the crossing of the Georges River by Alfords Point Road, and extends to the overpass at Brushwood Drive, Illawong.

Whilst largely limited to the road corridor itself due to adjacent land parcels being fenced and/or grade-separated, the study area extends eastwards and westwards to incorporate adjacent residential properties and areas of Georges River National Park as their relationship to the road corridor remains strong and this document considers the impact on the landscape unit in its entirety. Figure 1 shows the study area.

A number of road network upgrades sit near to the study area from which contextual urban design outcomes may be drawn. The Bangor Bypass (figure 2), completed in 2010, incorporates a portion of MetRoad 6 running south from the southern study area boundary for approximately three kilometres. The bypass then continues east linking MR6 to the Woronora Bridge (figure 3). The Woronora bridge, completed in 2001 continues the Bangor Bypass Route to Sutherland. Alfords Point Bridge (figure 4)



Figure 3 Woronora Bridge



Figure 5 Alfords Point Bridge



Figure 2 Bangor Bypass



Figure 4 Stacey Street

and Northern Approach projects sit immediately north of the study area. Six kilometres to the north of the site, noise barriers were placed along a portion of MR6 near Bankstown (figure 5). The relationship of these projects to the study area is shown in figure 6.

## 2.2 Landscape context

For a road user, the crossing of the Georges River at Alfords Point occurs at a spectacular portion of iconic Sydney sandstone landscape (figure 7). Whilst linking to the greater road network the study area





Stacey Street

Alfords Point Bridge  
Northern Approach

Alfords Point Bridge  
Duplication

Alfords Point Bridge  
Southern Approach

Truck Inspection Bay

Bangor Bypass  
Stages 1 and 2

Woronora Bridge

10m 1.5km N

Figure 6 Nearby projects





Figure 7 Sydney sandstone setting

along with the bridge and its northern approach, can be considered as a landscape experience in its own right. After emerging from residential areas further north, Clancy Street sits on a ridgeline, and Alford's Point Road passes beneath it in a cutting which exposes bare sandstone that underlies the entire site. This arrangement can be regarded as a gateway marking the commencement of the study area's unique landscape character.

Immediately before arriving at this gateway when approaching it from the north, a driver passes through highly developed residential and light industrial areas, crossing regular intersections to local feeder roads. After passing through the gateway, the nature of the road experience alters as land adjacent the road changes as it passes between Georges River National Park to the west and Beauty Point Reserve to the east to be dominated by large undeveloped tracts of remnant *Angophora costata/Corymbia gummifera* woodland visible on top of the cuttings. Because this portion of the road is characterised by broad on- and off-ramps the proximity of residences to the road corridor increases. Simultaneously, the road descends from the ridgeline in a fast-moving sweep through increasingly tall sandstone cuttings (figure 8), culminating in the crossing of the Georges River itself. The northern approach to the study area sits within a broader steep topographic decline from the north-east down to Georges River in the south west. This portion of the Georges River is flanked by more remnant *Angophora costata/Corymbia gummifera* woodland vegetation.

The experience is repeated on the southern approach to the Alford's Point Bridge, with the overpass at Brushwood Drive forming the landscape unit's southern extent. After a portion of the road constructed on fill, the highly vegetated corridor continues north characterised by cuttings of increasing height lining the corridor heading towards the bridge. Immediately south of the Alford's Point Bridge, within the study area, the adjacent landscape is also dominated by this

*Angophora/Corymbia* forest. The dense vegetation in the southernmost extent of the study area is revegetated rather than being formed from remnant forest, however the character of the vegetation remains constant.

## 2.3 Built and community context

Many of the residential areas within the study area to the immediate south of Alford's Point Bridge have an elevated position above the Georges River (and Alford's Point Bridge itself), the setting of which is enhanced by remnant vegetation which lines both the river's shores (figure 8).

Even where the comparatively busy Alford's Point Road occurs adjacent to properties on the western side of the corridor, the landscape character of this part of the study area's catchment remains highly sensitive to change.



Figure 8 View from residential area overlooking Georges River

Residential areas further south, away from the bridge and to the corridor's east, by comparison, largely face away from the road corridor: a near continuous boundary fence runs behind planting along the edge of the corridor where housing lots sit immediately adjacent. The properties are also located at a lower elevation than the road. These factors are considered to reduce the degree of impact on landscape character.

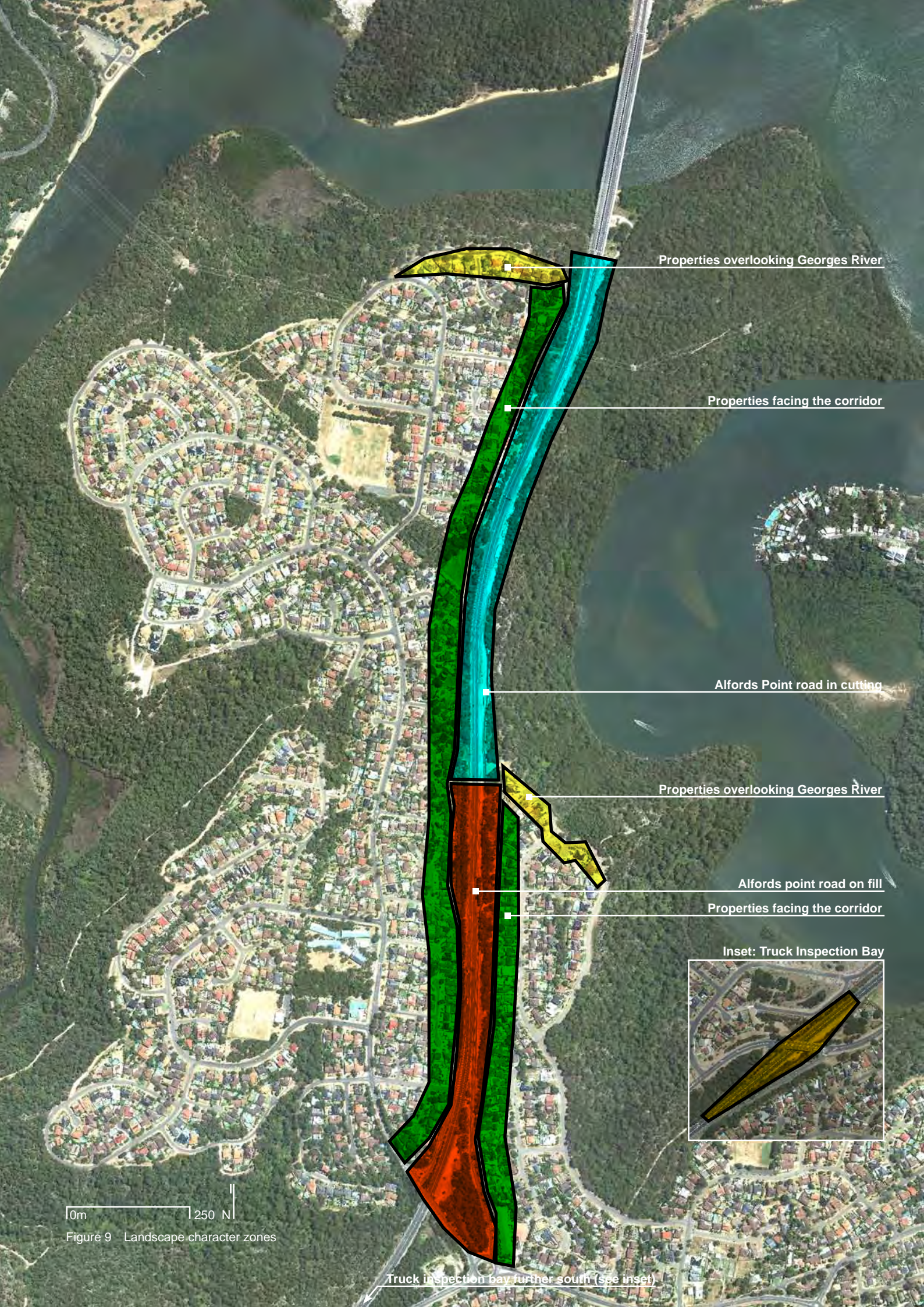
## 2.4 Landscape Character zones

Based on the landscape character assessment, there are a number of landscape character types which occur in the study area, which are shown in figure 9 on page 6. The sensitivity of these landscape character zones is described below.

### 2.4.1 Properties overlooking Georges River

This character type contains north-facing residential properties which overlook the Georges River. The





Properties overlooking Georges River

Properties facing the corridor

Alfords Point road in cutting

Properties overlooking Georges River

Alfords point road on fill

Properties facing the corridor

Inset: Truck Inspection Bay



0m 250 N

Figure 9 Landscape character zones

Truck inspection bay further south (See inset)



sensitivity to change of here is high due to the connection this zone has with Georges River itself.

#### 2.4.2 Properties adjacent the corridor

This character type is formed from the rows of residential properties in Illawong and Alfords Point adjacent the road corridor. This character zone has a moderate sensitivity it is usually side or rear boundaries which face the corridor and their address is to streets within the suburban residential areas. They are somewhat separated from the travel lanes by vegetation.

#### 2.4.3 Alfords Point Road on fill

This character type incorporates the portion of Alfords Point Road between about Chainage 800 (just north of the existing truck inspection bay) and the Brushwood Drive overpass and includes the Brushwood Drive onload and offload ramps. It has a moderate-high level of sensitivity – Whilst it is more highly modified than areas further north closer to the river, it is part of the broader landscape experience formed between

ridgelines and the river described above.

#### 2.4.4 Alfords Point Road in cutting

Situated between the southern abutment of Alfords Point Bridge and chainage 800, this is a highly sensitive area, based both on its dramatic landscape structure of sandstone cuttings, adjacent national park and occasional views of Georges River; and it also being part of the ridgeline-river landscape experience.

#### 2.4.5 Truck inspection bay

The truck inspection bay beneath the Old Illawarra Road overbridge would be constructed in an area of land already formed through previous earthworks. The sensitivity of the area is moderate – the sandstone cutting forming the boundary of the character zone is of high quality and similar to the other cuttings in the project and the existing bridge is of a simple, robust design; however this is detracted from by regrowth vegetation which partially screens it and graffiti on existing the bridge components.



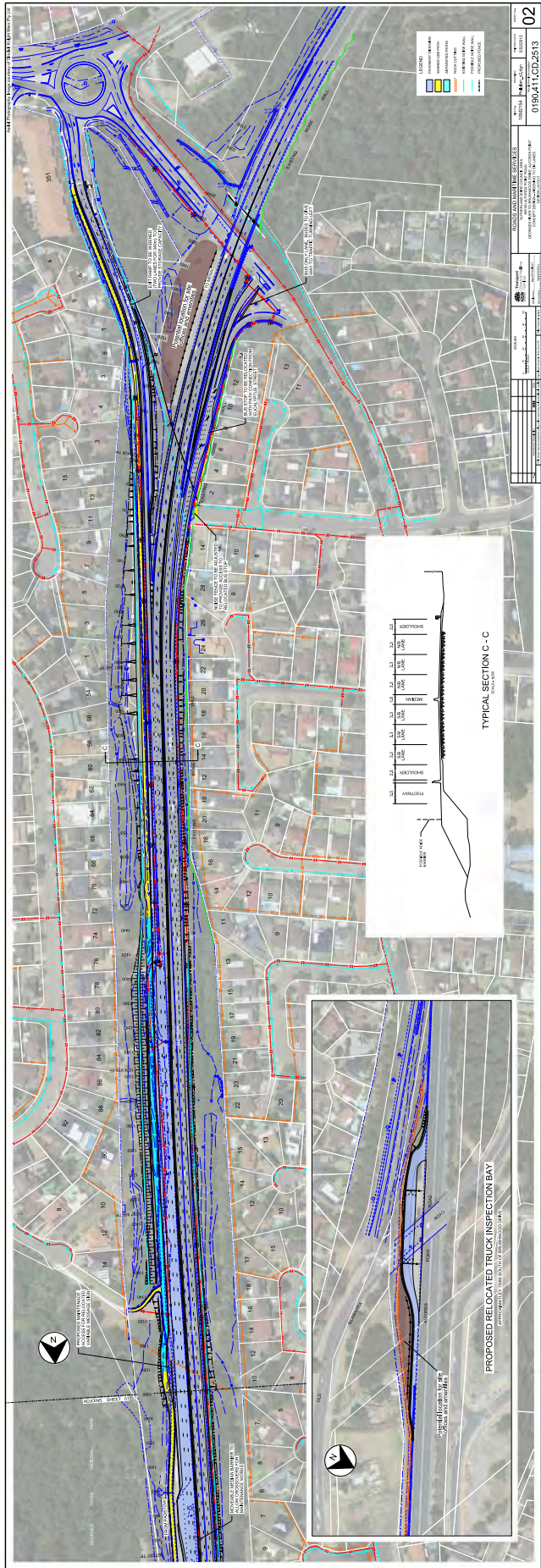
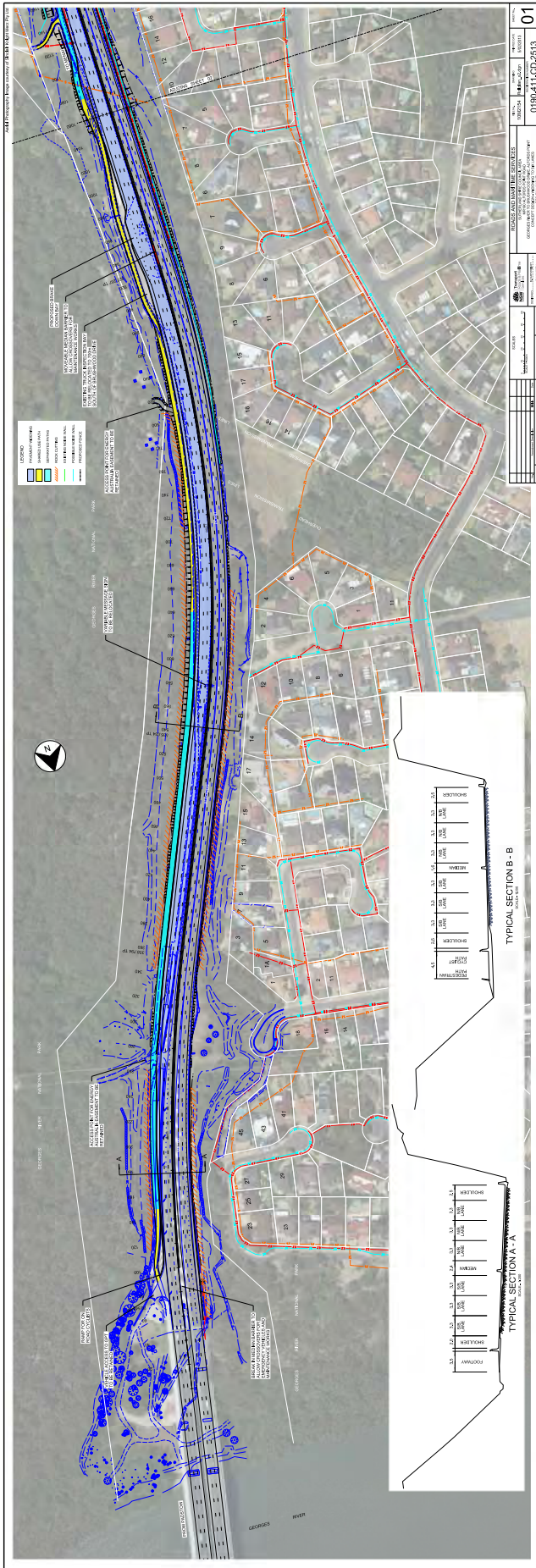


Figure 10 Concept design (Refer to Engineering drawings for more detail)

### 3 Landscape Character Impact

The impact on landscape character zones identified in the landscape analysis is described below, along with an description of the impact the proposal would have overall. The level of impact has been determined using the methodology contained in the Guidelines.

#### 3.1 Properties overlooking Georges River

A negligible magnitude of impact would be caused in this character zone primarily due to the fact that orientation of properties within the character zone is away from the project. The distance the properties are away from the project area further contributes to negligible impact.

Sensitivity: High  
Magnitude: Negligible  
Overall level of impact: Negligible

#### 3.2 Properties facing the corridor

The magnitude of impact to residents immediately adjacent to the corridor would be generally of a low level, in that currently they are separated from the proposed works by vegetation lining the corridor. Whilst some of that vegetation would be cleared, the separating effect of the vegetation would be only minimally reduced by the works.

A moderate level of impact would result, however, if noise barriers were constructed between residences and the corridor's eastern verge, whereby the character of those properties adjacent the southbound off-ramp would be affected due to the likely loss of vegetation required for their implementation. The overall level of impact for this character zone therefore would be moderate.

Sensitivity: Moderate  
Magnitude: Moderate  
Overall level of impact: Moderate

#### 3.3 Alford's Point Road on fill

There would be a level of impact to landscape character for road users for the section of Alford's point road from Brushwood drive to the extent of fill at around chainage 800, due to potential noise barriers on both verges should they be determined the best method to mitigate the project's noise impact. These barriers would be set back to allow them to be screened by vegetation, creating a moderate-low magnitude of impact. This would result in a moderate level of impact overall for this character zone.

The residual level of impact is caused by the fact that planting in front of the wall would not be of the same height and proximity to the travel lanes as existing planting. Considering the speed at which road users would travel and the relationship between the noise barrier and the rest of the road environment, the level of impact this creates is considered acceptable

Contributing to the assessed level of impact is the

need to remove vegetation on the Brushwood Drive northbound on-ramp in front of the existing noise wall to provide access for the relocated bus bay.

Also contributing to the assessment is the lesser impact of the increase in paved surface and barriers which would replace existing groundcover vegetation which exists on the site

Sensitivity: Moderate-high  
Magnitude: Moderate-low  
Overall level of impact: Moderate

#### 3.4 Alford's Point Road in cutting

Situated between the southern abutment of Alford's Point Bridge and chainage 800, there would be a moderate-high level of impact here due to the potential placement of a noise barrier on the western verge. This character zone sits immediately adjacent to the potential noise barrier. Again, the increase in paved surface and barriers is a minor contributor to the level of impact.

Sensitivity: High  
Magnitude: Moderate-low  
Overall level of impact: Moderate-high

#### 3.5 Truck inspection bay

Based on the limited change to topography and vegetation at the site, a low level of impact would occur here, formed from replacing groundcover vegetation with paving and slight increase in the quantity of barriers and structures. The overall level of impact on this character zone would be moderate-low.

Sensitivity: Moderate  
Magnitude: Low  
Overall level of impact: Moderate-low

#### 3.6 Overall landscape character impact

The impact caused by the proposal is highly dependent on any change to the experience of travelling across Georges River from ridgelines at Clancy Street and Brushwood Drive. This characteristic has a high sensitivity.

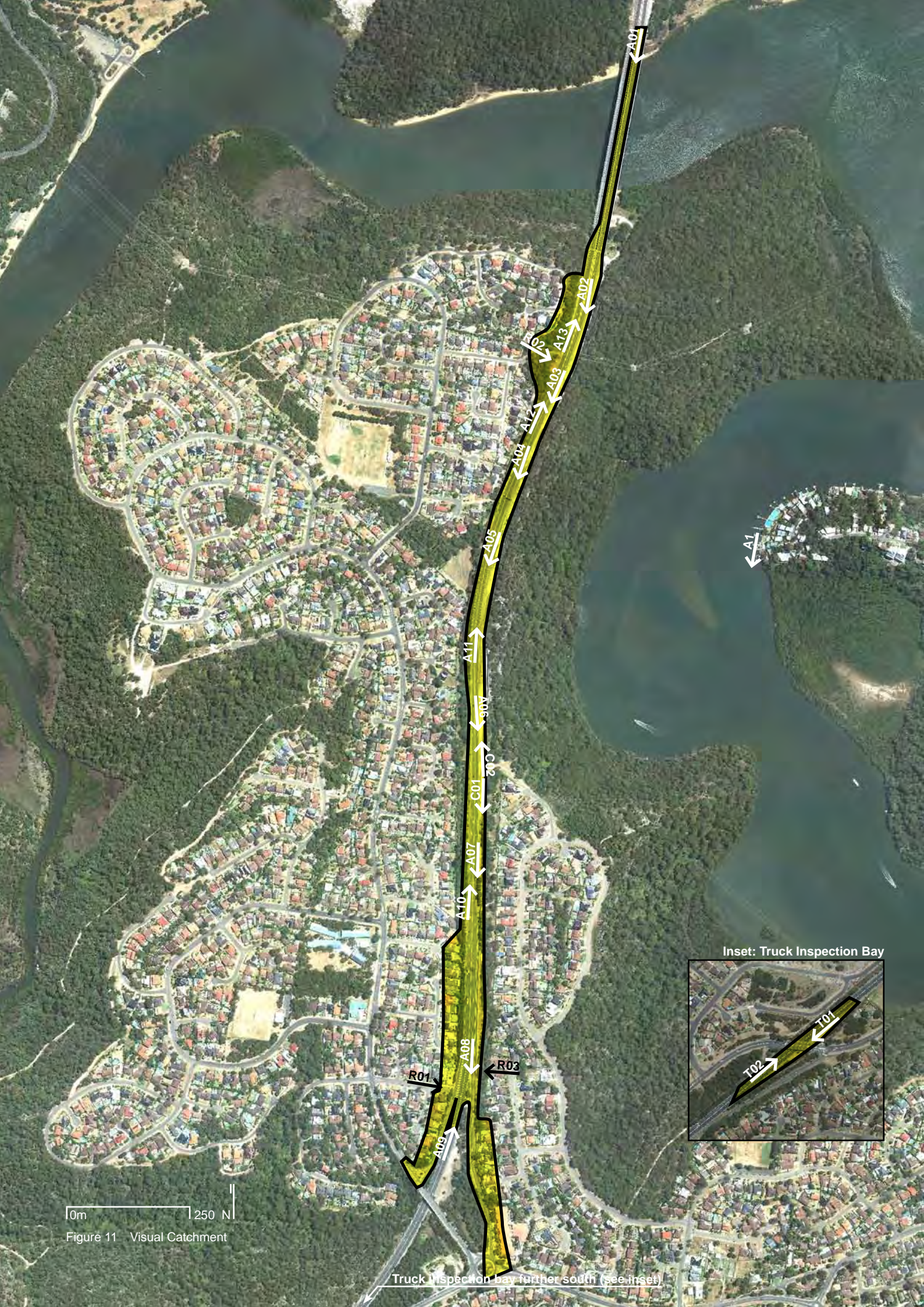
The magnitude of the proposal is low, in that the effect of the impacts from potential new noise barriers against the roadside edges are proposed to be mitigated by setting them back behind a planted screen.

Combined with the high sensitivity, the low magnitude results in an overall moderate level of impact which is considered acceptable from an urban design perspective.

Discussion of the methods which could potentially mitigate the adverse impacts of the project can be found in part six of this report.

Sensitivity: High  
Magnitude: Low  
Overall level of impact: Moderate





0m 250m

Figure 11 Visual Catchment

Truck inspection bay further south (see inset)



## 4 Visual Analysis

The proposed works largely sit within an existing road corridor constructed in the early 1970s. Cuttings have already been excavated to their ultimate width, meaning that road pavement and furniture remains all that would be left to be constructed along much of the study area's length.

Due to the physical characteristics of the site and the nature of the existing road corridor, it has been possible to define a catchment within which visual impact is limited (the area coloured yellow in figure 11). The visual catchment is mostly restricted to the Alfords Point Road corridor itself and residential properties immediately adjacent to its west due to the local cadastral arrangement and topography. It has not been considered necessary to undertake assessment from Georges River National Park or from the Georges River itself as the proposal has no visibility from these locations

A number of viewpoints within the study area's visual catchment have been selected as the basis for completion of the Visual Impact Assessment. Locations and directions of chosen viewpoints are indicated on figure 11. The chosen viewpoints essentially test the impact of the proposed development against two primary conditions:

- The impact experienced by users of Alfords Point Road
- The impact upon residents whose properties fall within the visual catchment.

Viewpoints A01-A13 consider the impact along Alfords Point Road. Viewpoints R01-R03 address impact from residential areas adjacent to the proposed development. Viewpoints C01 and C02 address the impact of the shared pedestrian/cycle path. Viewpoints T01 and T02 address the impact of the truck inspection bay.

The decision to assess the impact on road users as well as residents is felt to be warranted as the configuration of the existing road within its physical setting provides a powerful landscape experience. Decisions made during the resolution of the proposed

scheme can potentially enhance this experience so it is therefore essential that they are made from an informed basis. All activities associated with the proposed works are assessed as part of the visual impact assessment. As well as the construction of the road pavement, this report assesses the impact of any ancillary works including potential noise barriers; the shared pedestrian cycle path; vegetation removal; and other works.

Potential noise barriers have been assessed, but it is noted that an assessment of their feasibility/reasonableness would be completed during the detailed design phase. This assessment was completed on a worst case scenario that the potential noise barriers (as indicated on the plans in Appendix B) would be constructed. Further discussion of the design of noise barriers to minimise their visual impact should they be required can be found in part six of this document.

Appendix A contains plates of the selected viewpoints, grouped by the above conditions. A matrix has been prepared which quantifies the visual impact at each viewpoint. The gradings are measured on their impact relative to each other within the scope of the proposal rather than to an absolute scale covering all potential forms of impact. The overall impact at each viewpoint was determined based on the magnitude of impact and sensitivity of view to change at each site, as per the methodology in the guideline. For both adverse and beneficial impacts, there is a general correlation between the sensitivity and magnitude at each viewpoint eg where a highly sensitive view is affected by a change of high magnitude, the resultant impact is also quantified as high. Low sensitivity and high magnitude give a moderate impact. Where the nature of impact is assessed as being Neutral, the visual impact has been rated as low in all cases.

Through this process, the visual impact of the proposal as a whole has been identified. Design opportunities and areas requiring mitigation have emerged and these are discussed following the assessment.

<b>View</b>	<b>Description of setting</b>	<b>Sensitivity of view <sup>[1]</sup></b>	
A01	Looking south towards project from north abutment of Alfords Point Bridge	H	Sensitivity of view is determined by bushland setting with little
A02	Looking south from within project from approximate Chainage 200	H	Sensitivity of view at this location is mainly from vegetation and sandstone cutting on western verge.
A03	Looking south from within project from approximate Chainage 350	H	Sensitivity of view at this location is mainly from vegetation and sandstone cutting on western verge.
A04	Looking south from within project from approximate Chainage 500	H	Sensitivity of view at this location is mainly from vegetation on eastern verge, and sandstone cutting on western verge.
A05	Looking south from within project from approximate Chainage 700	MH	Hardstand area is currently a visual detractor.
A06	Looking south from within project from approximate Chainage 1160	H	Sensitivity of view at this location is mainly from vegetation.
A07	Looking south from within project from approximate Chainage 1330	H	Sensitivity of view at this location is mainly from vegetation.
A08	Looking south from within project from approximate Chainage 1620	MH	Sensitivity of view at this location is mainly from vegetation.
A09	Looking north from within project from approximate Chainage 1760	M	Existing ramps and surrounding vegetation help determine sensitivity of view.
A10	Looking north from within project from approximate Chainage 1400	H	Sensitivity of view at this location is mainly from vegetation and sandstone cutting on western verge.
A11	Looking north from within project from approximate Chainage 1050	H	Sensitivity of view at this location is mainly from vegetation and sandstone cutting on western verge.
A12	Looking north from within project from approximate Chainage 500	H	Sensitivity of view at this location is mainly from vegetation and sandstone cutting on western verge.
A13	Looking north from within project from approximate Chainage 250	H	Sensitivity of view at this location is mainly from vegetation and sandstone cutting on western verge.
R01	Looking east towards project from Eucalyptus St, Alfords Point	M	Sensitivity of view is determined here by vegetation, streetscape and existing noise wall.
R02	Looking east towards project from reserve adjacent Marlock Pl, Alfords Point	VH	Density of existing vegetation screen and elevation above carriageway at top of cutting determine sensitivity.
R03	Looking west towards project from Sand Pl, Illawong	M	Sensitivity of view is determined here by backdrop of vegetation and elements of existing residential development.
C01	View south along existing temporary cycleway near connection to Maxwell Pl. at Chainage 1150	MH	Vegetation flanking the corridor, and existing fences determine sensitivity of view
C02	View north along existing temporary cycleway near connection to Maxwell Pl. at Chainage 1150	MH	Vegetation flanking the corridor, and existing fences determine sensitivity of view
T01	View of relocated truck inspection bay site southbound	H	Sensitivity determined by vegetation, topography and existing bridge elements
T02	View of relocated truck inspection bay site northbound	H	Sensitivity determined by vegetation, topography and existing bridge elements

[1] G=Negligible, L=Low, ML=Moderate Low, M=Moderate, MH=Moderate High, H=High

Table 1 Visual analysis



## 5 Visual Impact Assessment

Assessing the impact of the proposal at the chosen viewpoints has revealed that there would be a moderate level of visual impact. The assessed level of impact is largely due to potential noise barrier. Screening of the potential noise barrier with vegetation would reduce the level of its visual impact

The visual impact of the proposal can be regarded as being relatively minor as the corridor was established during the original works in the 1970s. Any activities which significantly detract from the visual amenity of the site occurred at that time. Whilst about 3.8 hectares of vegetation would be cleared to construct the works, there is a sufficient width of existing vegetation which would remain such that the impact of clearing as proposed would be low.

Detailed assessment of the proposal against viewpoints is tabulated on the following pages.

### 5.1 Impact upon users of Alfords Point Road

The widening of Alfords Point Road could potentially provide an enhanced driving experience for its users. The situation of the road in its powerful landscape setting would arguably enhanced by the improved driving conditions provided via the proposal.

The potential noise barrier, however, would on balance detract from the uniqueness of the landscape by replacing the vegetation which is part of the roadside setting of the area giving it a high sensitivity to change. This component of the proposal would increase in visual impact beyond any of the beneficial impacts of improved traveling experience. Planting is proposed in front of the potential wall to mitigate the magnitude of impact to a low level. Combined with the high sensitivity, a moderate level of impact would result overall

The construction of an off-road shared path on the eastern verge of Alfords Point Road would not affect

the visual amenity of the study area in that it sits at grade in the approximate location of the temporary path it replaces.

A moderate impact would occur against the Brushwood drive northbound on-ramp where vegetation screening the existing noise barrier would be removed for the construction of a new footpath and relocation of the existing bus stop.

### 5.2 The impact upon residents whose properties fall within the visual catchment.

The most extensive cause of visual impact to residential areas would occur if the potential roadside noise barriers were constructed although generally the impact would be low.

- Residents on the western side of Alfords Point Road near the Brushwood Drive northbound on ramp would have adjacent vegetation removed for construction of the relocated bus stop and footpath, impacting the outlook from the rear of their properties.
- The potential noise barrier along the western edge of the road is considered to have a low visual impact to the adjacent residences given the distance between the residences and the roadside edge. For the same reason shadowing is not considered to be an issue. Some vegetation will require removal however there will still be some vegetation retained as a buffer
- Residences on the eastern side of the road near the southbound off ramp may experience a moderate level of impact by the adjacent vegetation removal which currently provides a buffer to the adjacent road. The residents are located at a lower elevation than the road and vegetation loss may cause a reduction in privacy. Mitigation measures to reduce this to a low level impact are outlined in section 7.

View	Visual Sensitivity <sup>[1]</sup>	Element of project visible	Nature of Impact <sup>[2]</sup>	Magnitude of Visual Effect <sup>[1]</sup>	Summary	Resultant rating of visual impact <sup>[1]</sup>
A01	H	Widened carriageway commencing at merge at end of bridge	A	G	Distance to works makes impact negligible at this location	G
A02	H	Widened carriageway, median barrier and barrier to shared path, potential noise barrier and associated screen planting in distance	A	L	Vegetation and sandstone cutting on western verge are unaffected by proposal. Potential noise barrier in distance on western verge would increase level of impact	M
A03	H	Widened carriageway, median barrier and barrier to shared path, potential noise barrier and associated screen planting in distance	A	L	Vegetation and sandstone cutting on western verge are unaffected by proposal. Potential noise barrier in distance on western verge would increase level of impact	M
A04	H	Widened carriageway, median barrier and barrier to shared path, potential noise barrier and associated screen planting	A	L	Potential noise barrier would be prominent in western verge. On eastern verge, quality of view is unaffected by proposal	M
A05	MH	Widened carriageway, Relocated VMS median barrier, barrier to shared path, and potential noise barriers with associated screen planting	A	L	Potential noise barriers would be prominent in both verges. Hardstand area is currently a visual detractor. The proposal will improve this situation. VMS would replace similar one nearby therefore it does not affect assessed level of impact	M
A06	H	Widened carriageway, median barrier, barrier to shared path and potential noise barriers with associated screen planting	A	H	Potential noise barriers would be prominent in both verges. Magnitude of impact at this location is mainly due to affected vegetation and potential noise barriers	H
A07	H	Widened carriageway, median barrier, barrier to shared path and potential noise barriers with associated screen planting	A	H	Potential noise barriers would be prominent in both verges. Magnitude at this location is mainly from affected vegetation and potential noise barrier.	H
A08	MH	Widened carriageway, median barrier, barrier to shared path, potential noise barrier on eastern verge.	A	MH	Magnitude at this location is mainly determined by lack of impact to vegetation and potential noise barrier	MH
A09	M	New path to relocated bus stop & noise barrier on left of image; Widened carriageway, median barrier, potential noise barrier & barrier to shared path to right of existing pavement	A	MH	Vegetation would need to be cleared to accommodate footpath and relocated bus stop with resultant impact. Impact also due to potential noise barrier on eastern verge restricting view to existing vegetation	MH
A10	H	Widened carriageway, median barrier, potential noise barriers with associated screen planting, barrier to shared path, relocated VMS	A	MH	Potential noise barrier would be prominent in both verges. Magnitude at this location is mainly from view to vegetation and sandstone cutting on western verge and view to vegetation on eastern verge which would be affected by the potential noise barriers	H
A11	H	Potential noise barrier with associated screen planting adjacent travel lane on left of image	A	M	Potential noise barrier would be prominent in western verge. Magnitude of view at this location is mainly from vegetation and sandstone cutting on western verge which would be affected by the potential noise barrier	MH
A12	H	Widened carriageway, median barrier and barrier to shared path	A	L	Magnitude at this location is mainly from vegetation and sandstone cutting on western verge which are unaffected by proposal. Increase of hard surface and barriers contributes to rating	M

[1] G=Negligible, L=Low, ML=Moderate Low, M=Moderate, MH=Moderate High, H=High

[2] A=Adverse, N=Neutral, B=Beneficial

Table 2 Visual impact assessment

View	Visual Sensitivity <sup>[1]</sup>	Element of project visible	Nature of Impact <sup>[2]</sup>	Magnitude of Visual Effect <sup>[1]</sup>	Summary	Resultant rating of visual impact <sup>[1]</sup>
A13	H	Widened carriageway, median barrier and barrier to shared path	A	L	Magnitude at this location is mainly from vegetation and sandstone cutting on western verge which are unaffected by proposal. Increase of hard surface and barriers contributes to rating	M
R01	M	New path connection, potential noise barrier on eastern verge	A	L	Impact limited by prominence of existing wall relative to scale of proposal	ML
R02	VH	Widened carriageway, median barrier and barrier to shared path	A	G	Density of existing vegetation screen and elevation above carriageway limits magnitude of effect from this viewpoint	G
R03	M	Potential reduced vegetation in backdrop	A	L	Vegetation screen may slightly be affected which may impact residents' privacy. Mitigation measures to reduce this impact are noted within section 7	M
C01	M	New shared path on approximate alignment of existing; Widened carriageway, potential noise barriers and associated screen planting on both verges	A	H	View after construction would be impacted by potential noise barrier on both verges	MH
C02	M	New shared path on approximate alignment of existing; Widened carriageway, potential noise barrier and associated screen planting on western verge	A	H	View after construction would be impacted by potential noise barrier on western verge	MH
T01	H	Truck inspection bay to left of carriageway	A	L	Magnitude limited due to the different elevation between the road and surrounding residents and further screening by existing vegetation	M
T02	H	Truck inspection bay to right of carriageway	A	L	Magnitude limited due to the different elevation between the road and surrounding residents and further screening by existing vegetation	M

[1] G=Negligible, L=Low, ML=Moderate Low, M=Moderate, MH=Moderate High, H=High  
[2] A=Adverse, N=Neutral, B=Beneficial

Table 2 Visual impact assessment (continued)

## 6 Urban Design Objectives And Principles

This section sets down objectives and principles which will guide the further development of the project. These will help fit the road upgrade into the natural built and community setting, improve the travelling experience for road users and in so doing will help avoid and minimise adverse visual impacts.

These objectives and principles are grouped under four headings: Fitting the upgrade into the existing road and landscape setting; planting design, improvements to off-road path; fitting the upgrade into the adjacent road network; and noise barrier design.

How these principles may be resolved in plan and cross section is shown in the following appendix.

### 6.1 Fitting the upgrade into the existing road and landscape setting

It is to be noted that the existing road was initially well designed and unified with its surrounding landscape setting. Provision was made at the time for widening to be carried out in such a way that the ultimate road configuration should be just as successful and sensitive in urban design terms as the original 1973 works.

This farsightedness has played a major role in ensuring a good design outcome and has ensured the visual assessment has found the proposal would overall have only minor visual impact and therefore fit relatively well into the existing environment.

Additionally, as the surrounding landscape is so dramatic and memorable, the approach to urban design would be correspondingly minimal. Treatments of retaining walls, verges, medians, barriers and infrastructure elements would all be of simple and robust detail and be achieved in a manner which is considerate of the greater landscape experience. The acknowledgement that the study area forms part of a greater site incorporating the northern approach to Alford's Point Bridge and the bridge itself will be a consideration of any design approach. It is also worthwhile to note that portions of MetRoad 6 situated further north and south of the site have recently been upgraded. Their proximity to the study area should influence the design considerations taken subsequent to this study.

### 6.2 Planting design

The study area is a well vegetated corridor. The proposal would increase the amount of hard surfacing around the project site. This, along with the removal of around four hectares of vegetation, will change the character of the study area. If possible, the paved area should be minimised, and broken up by a

combination of introducing a planted verge between the southbound carriageway and shared path; and setting the shared user path back towards the corridor boundary rather than immediately adjacent to the travel lanes.

Species from the Alford's Point Bridge Northern Approach would be selected again for use in this project. An indicative species list is below. The site would be planted or seeded based on whichever method would give the best ultimate vegetation cover.

#### Trees

*Angophora costata* (Smooth-Barked Apple)  
*Eucalyptus haemastoma* (Scribbly Gum)

#### Shrubs

*Acacia* spp. (Wattle)  
*Banksia serrata* (Old Man Banksia)  
*Banksia spinulosa* (Hairpin banksia)  
*Doryanthes excelsa* (Gynea Lily)  
*Persoonia linearis* (Geebung)  
*Pimelia linifolia* (Riceflower)

#### Grasses and groundcovers

*Dianella caerulea* (Paroo Lily)  
*Hardenbergia violacea* (Coral Pea)  
*Isolepis nodosa* (Knobby Club Rush)  
*Lomandra* spp. (Mat Rush)

### 6.3 Improvements to off-road path

Between the project's northern extent and the southern extent of the cutting at approximate chainage 800, the shared path should be set back from the travel lanes towards the toe of cutting, and the area between should be planted. This is illustrated in the appendix on the section through chainage 600.

The off road path should have small areas with seats and shade trees planted to increase its level of amenity. Their locations should be at the uphill end of the steepest sections of the path. Proposed locations for these are indicated on the plans in the appendix.

### 6.4 Fitting the upgrade into the adjacent road network

The designs of structures such as barriers, lighting, retaining structures, Variable message signs and the like should be coordinated with the bridge design so they all appear as part of the same suite of elements, including matching adjacent projects. They should not be made overly complex or elaborate but be simple and robust in appearance.

## 6.5 Noise barrier design

If constructed, the potential noise barriers would lead to loss of visual amenity for both residents and road users, and would result in a high landscape character impact overall in the absence of mitigation measures.

The approach to their design would require great care. The RTA publication *Noise Wall Design Guideline* (RTA, 2007) discusses many methods which can lead to a superior outcome when noise barriers are unavoidable. Given the physical characteristics of the study area, the following principles would be adopted in the design of the noise barriers so that they are closely integrated into the development.

- Set back to allow planting - the existing noise barrier in the project area is set behind a screen of planting dense to the extent that the wall is not visible. The impact of the potential noise barrier on landscape character would be lowered to a moderate level if screened with planting. This would need to be investigated during detailed design. This assessment has been prepared on the basis that screening is feasible, and there would be an associated increase in the landscape character and visual impact should this not be the case.
- Visual consistency – The design of noise barriers in nearby portions of MetRoad 6, in particular those on the northern approach to Alford's Point Bridge, should be considered for consistency.
- Visual Bulk – The height of noise barriers can potentially dominate their context. Careful selection of materials, colour and texture on visible faces of the wall can break up this dominant nature, particularly where walls are directly visible from private properties. Transparent panels would

be considered where maintaining solar access or views is important, such as near Eucalyptus Place.

- Different design approach to each face – Should walls be required relatively close to residential properties,, it would soften the visual appearance to residents to adopt finer grain on this face of the wall when compared to the road-side face.
- Vertical alignment – Careful consideration of the vertical alignment of walls would be required and a complete long elevation of each wall would be produced when preparing detailed design proposals.
- Horizontal alignment – It is noted that the width of the road corridor is extremely limited in areas. To effectively mitigate their visual impact to road users, noise barriers should be set back to allow for planting between them and the road.
- Retention of solar and visual access – The potential for walls to block solar access and views from residential properties is high, and incorporation of transparent panels in the walls design may be appropriate. It also noted that access to a bus stop will be required through a noise barrier being opening being reconfigured to face to the south. This wall currently is constructed from transparent panels to provide increased personal safety to pedestrians and this feature should be retained.

Regardless of the chosen approaches to the resolution of noise barrier design, they must not undermine attempts to create the simple design response required for the proposal.

Detailed design would consider all of the above criteria.



## 7 Conclusion and Recommendations

This report has considered the landscape character impact and visual impact of the proposed Alford's Point Road upgrade between Alford's Point Bridge and Brushwood Drive. The report also incorporates urban design principles and objectives appropriate for the project's scope.

The project would have landscape character impact and visual impact based on the proposed scope of works. However, mitigating these impacts as far as possible using techniques identified in this report and adopting design recommendations provided would result in a project which is consistent with RMS urban design policy.

The following recommendations are made based on the above assessment:

- If the potential noise barriers are confirmed, a feasibility study is to be completed during detailed design to assess and confirm the assumption that there is sufficient space to incorporate screen planting. If there is insufficient setback able to be achieved, this assessment should be updated based on the noise barrier proposed to be constructed.
- An urban design contractor from RMS panel should be engaged for the detailed design phase to ensure adequate consideration of urban design principles and objectives, and to ensure mitigation of identified impacts as the design resolves in more detail.
- Where vegetation loss potentially reduces the amount of screening between residents, the shared user path and residents of Illawong, causing

potential loss of privacy, the following techniques to mitigate this impact would be used individually or collectively

- Constructing informal low retaining walls at the base of the proposed embankment to increase the amount of existing vegetation retained as shown in figure 12 below.
- installing advanced plant stock adjacent the proposed shared user path at the top of the embankment
- installing advanced plant stock between the base of the proposed embankment and the property boundary
- using fast-growing species (such as Acacia) in the species mix on the embankment



Figure 12 Example of informal low retaining wall

# Appendix A - Visual Impact Assessment Viewpoints

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Viewpoint A01 Looking south from the northern abutment of Alfords Point Bridge



Viewpoint A02 Looking south from within project from approximate Chainage 200





Viewpoint A03 Looking south from within project from approximate Chainage 350



Viewpoint A04 Looking south from within project from approximate Chainage 500





Viewpoint A05 Looking south from within project from approximate Chainage 700



Viewpoint A06 Looking south from within project from approximate Chainage 1160





Viewpoint A07 Looking south from within project from approximate Chainage 1330



Viewpoint A08 Looking south from within project from approximate Chainage 1620





Viewpoint A09 Looking north from within project from approximate Chainage 1760



Viewpoint A10 Looking north from within project from approximate Chainage 1400





Viewpoint A11 Looking north from within project from approximate Chainage 1050



Viewpoint A12 Looking north from within project from approximate Chainage 500





Viewpoint A13 Looking north from within project from approximate Chainage 250



Viewpoint R01 Looking east towards project from Eucalyptus Street, Alfords Point





Viewpoint R02 Looking east towards project from reserve adjacent Marlock Pl, Alfords Point



Viewpoint R03 Looking west towards project from Sand Pl, Illawong





Viewpoint C01 View south along existing temporary cycleway near connection to Maxwell Place at Chainage 1150



Viewpoint C02 View north along existing temporary cycleway near connection to Maxwell Place at Chainage 1150





Viewpoint T01 View of relocated truck inspection bay site southbound



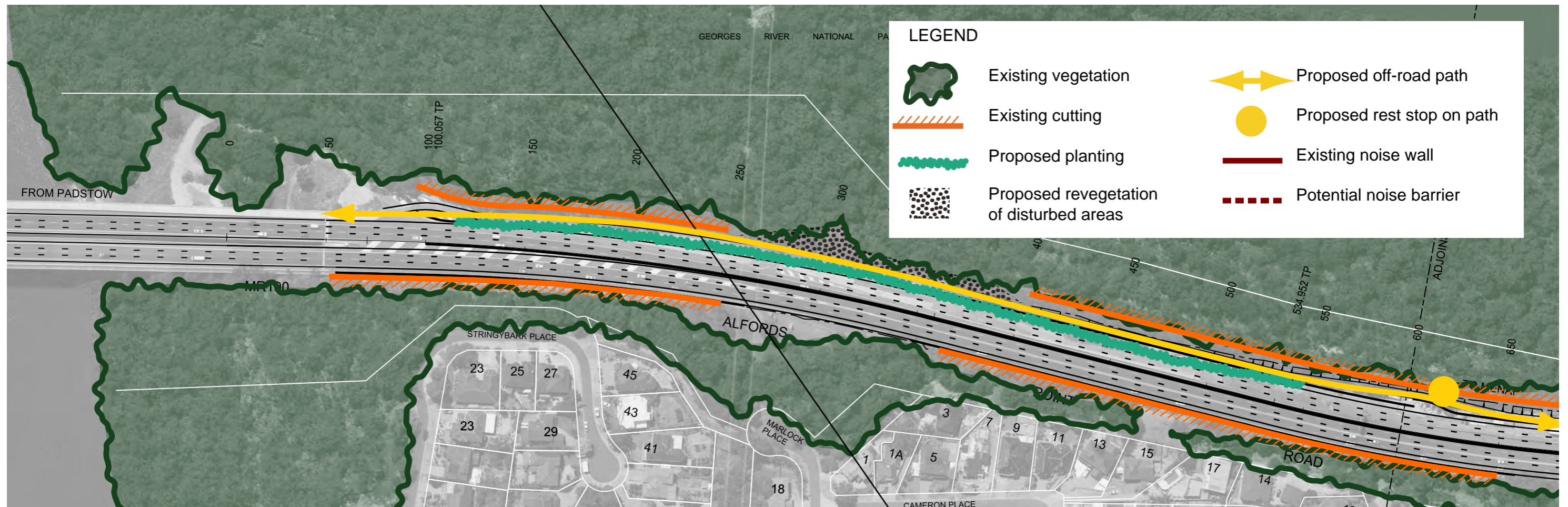
Viewpoint T02 View of relocated truck inspection bay site northbound

# Appendix B - Plans and cross sections



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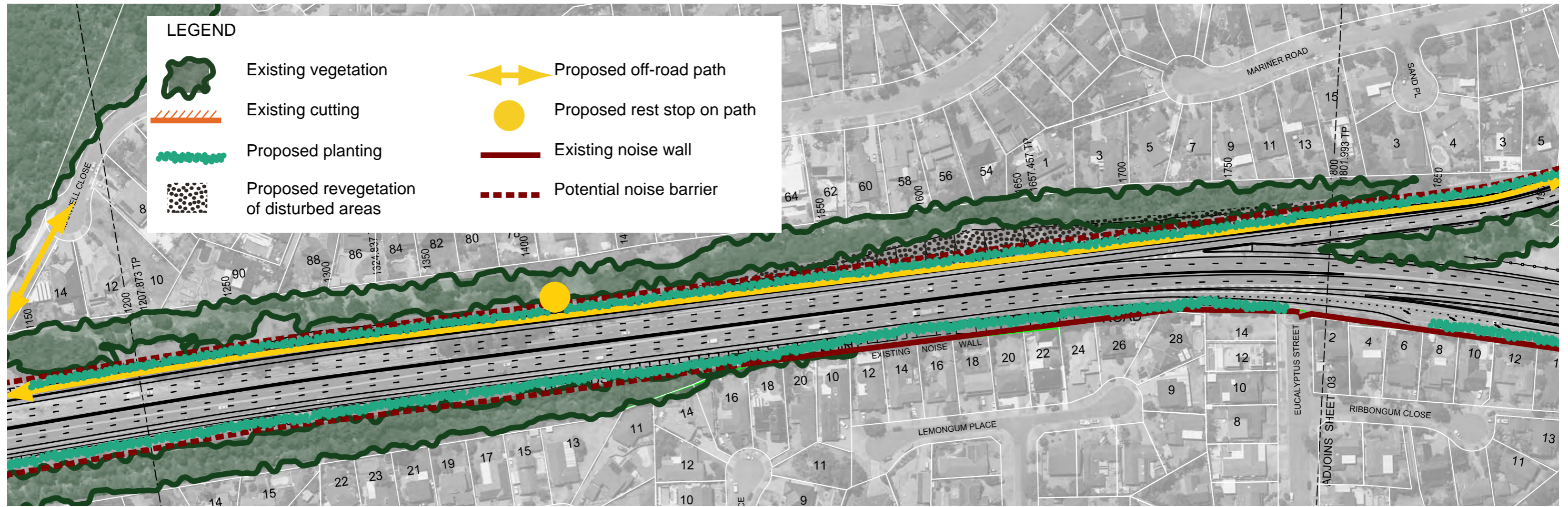


Plan part 1 (1:2000)

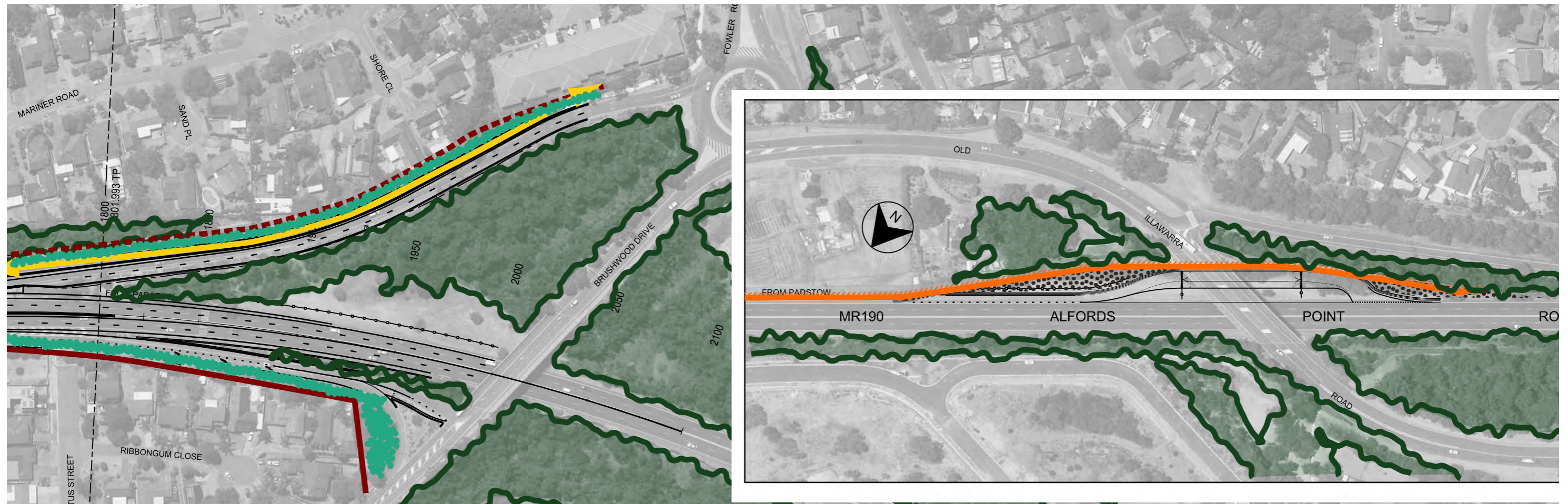


Plan part 2 (1:2000)



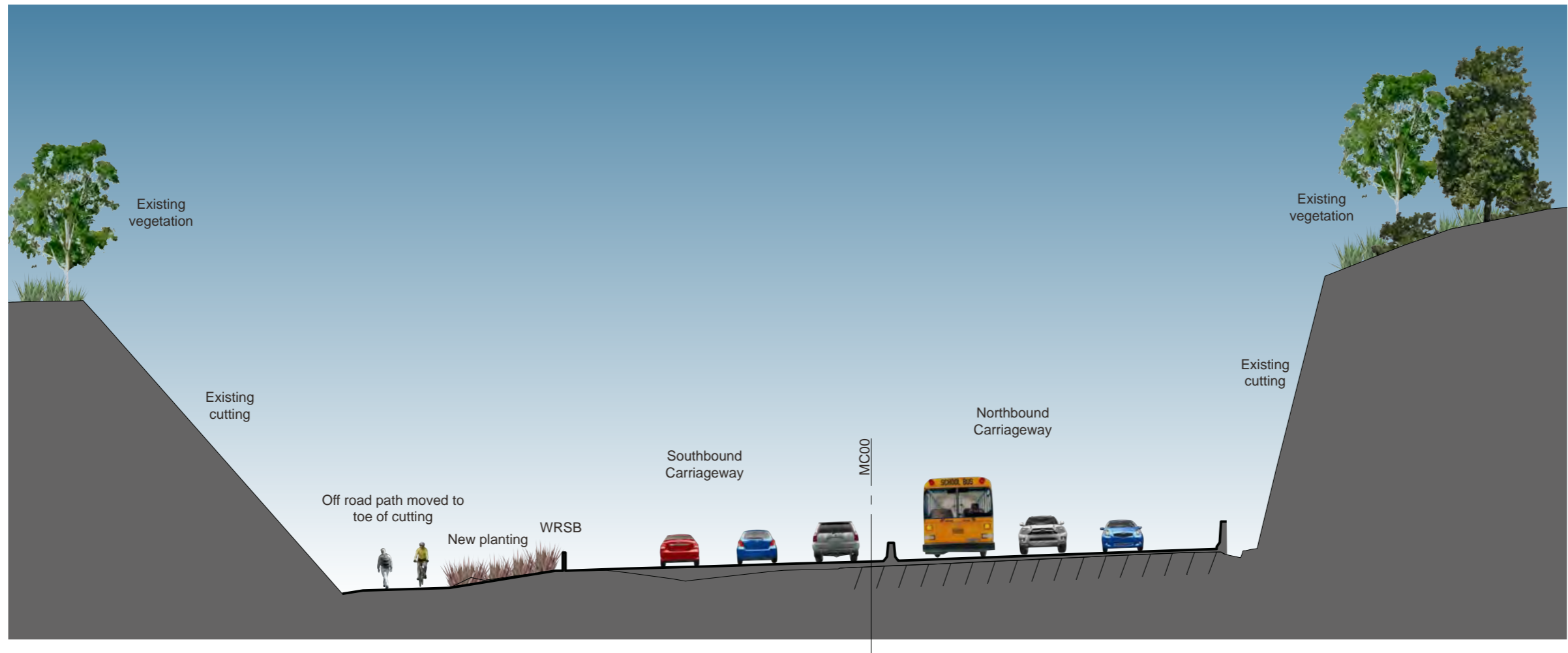


Plan part 3 (1:2000)

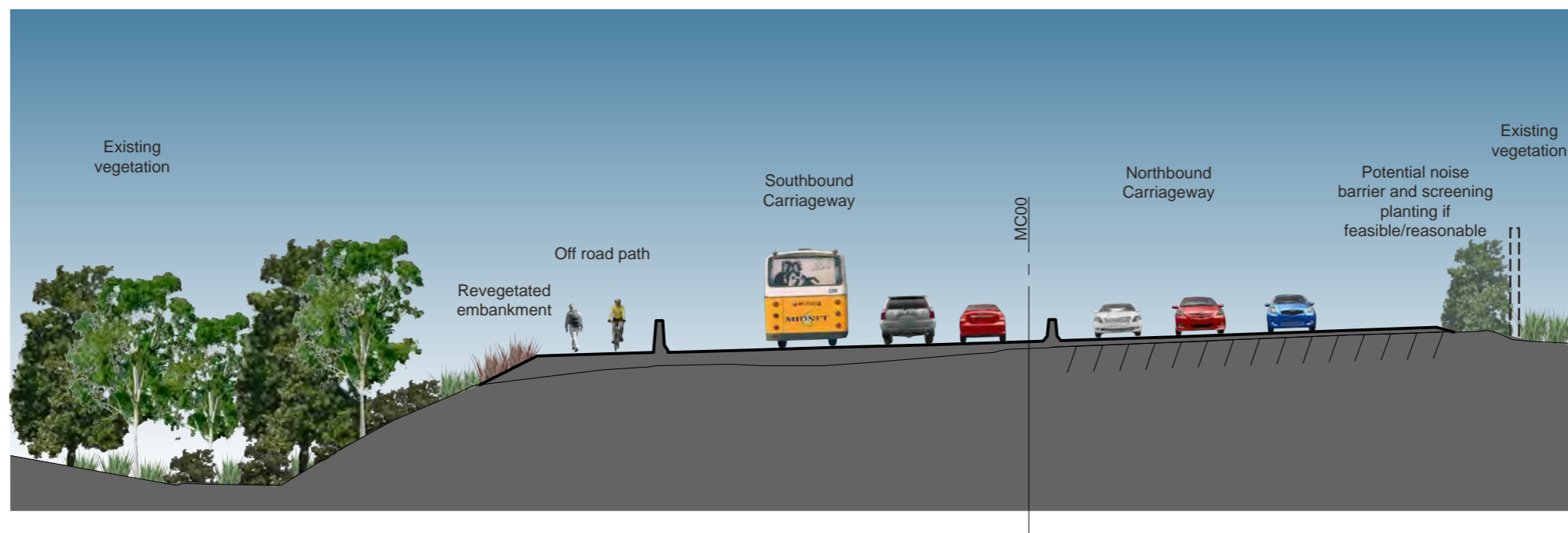


Plan part 4 (1:2000)



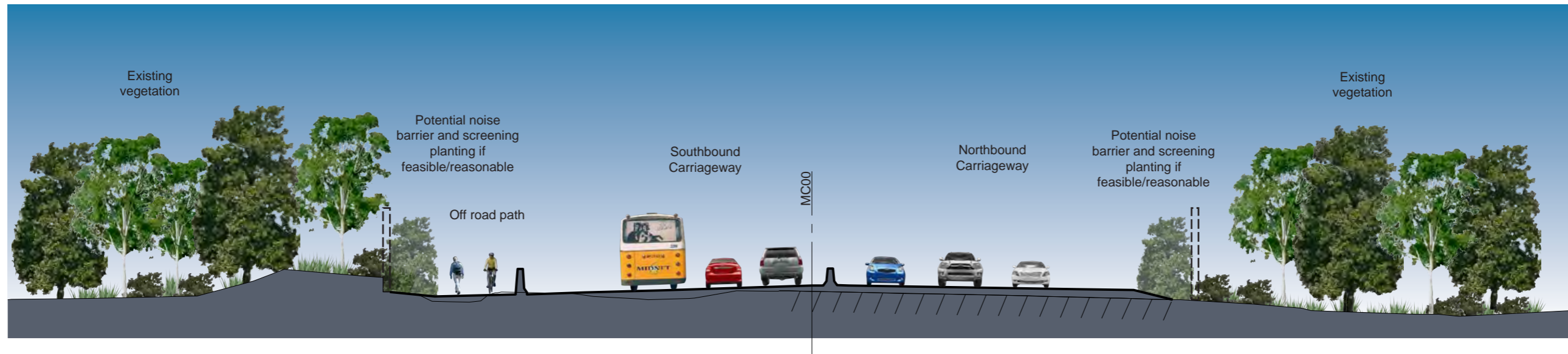


Section at CH600 (1:200)

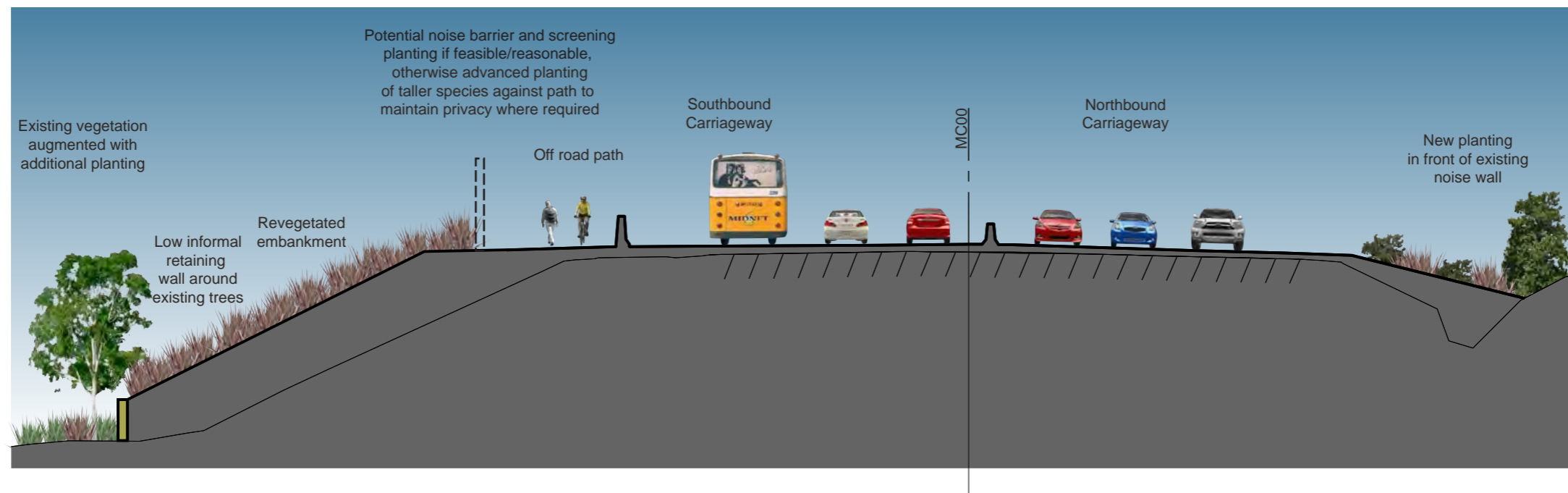


Section at CH840 (1:200)





Section at CH1340 (1:200)



Section at CH1620 (1:200)

# Appendix C - Guidelines for Landscape Character and Visual Impact assessment



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# Environmental Impact Assessment Guidance Note

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Guidelines for landscape character and visual  
impact assessment

EIA-N04

# About this release

<b>Reference number</b>	EIA-N04
<b>Title</b>	Guidelines for landscape character and visual impact assessment
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# Guidelines for landscape character and visual impact assessment

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## Key points

- This guidance note applies to projects and concept plans for which RTA is seeking Minister's approval under Part 3A and Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).
- Landscape character and visual impact assessment addresses both impacts on the character of a place and the views within that place.
- Landscape character relates to the built, natural and cultural aspects that makes a place unique.
- The purpose of landscape character and visual impact assessment is to improve design outcomes, report on impacts and propose mitigation of those impacts.
- Landscape character and visual impact assessment is related to the RTA urban design process in that it addresses visual and character issues – two aspects of a good urban design outcome.
- Professional staff trained in landscape and visual assessment and urban design must be used to carry out landscape character and visual impact assessment.

# Contents

1	Introduction.....	3
2	Assessment terminology .....	6
3	When to carry out landscape character and visual impact assessment.....	7
4	Landscape character and visual impact assessment tasks.....	8
5	Combining landscape character and visual impact assessment with urban design reporting in environmental assessment documents .....	15
6	Assessment checklist.....	16
7	References .....	17
8	Definitions .....	17
9	Responsibilities.....	17
10	Related procedures, guidance notes and templates.....	17
	Checklist .....	18



# I Introduction

This document has been prepared to guide the carrying out of landscape character and visual impact assessments under Part 3A and Part 5 of the EP&A Act. It sets down the terminology, process and methodology for assessment to ensure that it is carried out consistently, to a high standard and properly integrated with other environmental assessment policies, urban design policy and also the *ProjectPack* and *MinorProject project management processes*.

## I.1 The purpose of landscape character and visual impact assessment

There are two main purposes of landscape character and visual impact assessment:

1. To inform the development of the preferred route and concept design so that the proposal can avoid and minimise impacts up front. It must be commenced early in the environmental impact assessment (EIA) process to achieve this goal and integrated with the design process. (see figures I-1 and I-2)
2. To inform the project approval authority, other agencies and the community about the landscape character and visual impact of the proposal and what mitigation strategies will be implemented.

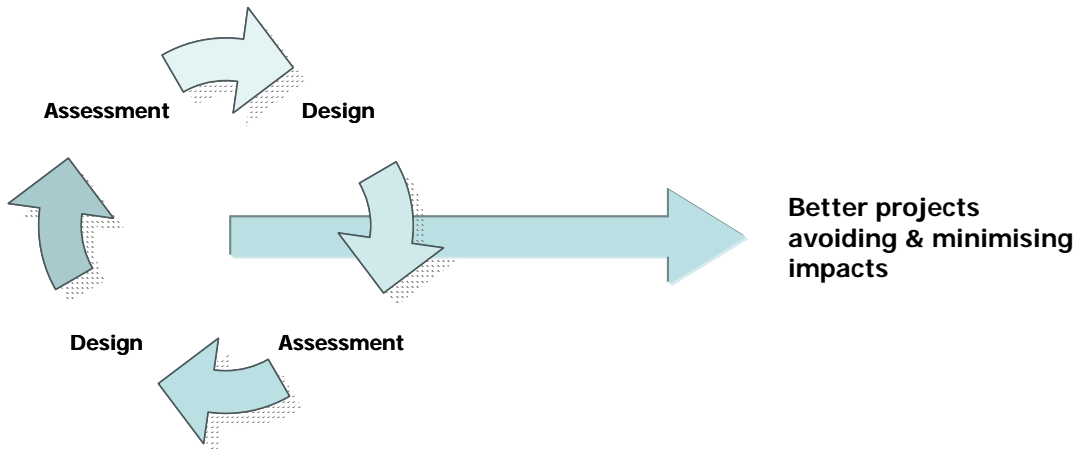


Figure I-1 Assessment should not be carried out in isolation with design.

Design and assessment iteration leads to better design outcomes with lesser impacts and fewer costly mitigation measures.

## I.2 Audience for the document

The guidance note is to be used by planning, urban design and landscape design professionals and by those who will be appointing and working with those consultants such as project managers and environmental assessment managers.

The guidance note does not replace the need for professional involvement in the fields of character and visual assessment. The RTA Urban Design Section can provide advice on the use of experts registered under the RTA Registration Scheme for Construction Industry Contractors. In some cases on projects assessed by an REF process, the Urban Design Section may be able to directly assist in the assessment work.

### 1.3 The difference between visual impacts and landscape character impacts

The guidelines differentiate between *visual assessment* - the impact on views - and *landscape character assessment* - the impact on the aggregate of an area's built, natural and cultural character or sense of place.

Character and visual assessment are equally important. Visual impact assessment helps define the day to day visual effects of a project on people's views and landscape character assessment helps determine the overall impact of a project on an area's character and sense of place.

This dual assessment will help differentiate options, improve route alignment decisions and improve design outcomes.



**Fig 1-3 The difference between landscape character assessment and visual assessment**  
*Landscape character assessment sums up an area's sense of place including all built, natural and cultural aspects, covering towns, countryside and all shades between. Visual assessment addresses people's views of an area from their homes or other places of value in the community.*



## 1.4 How to measure landscape character and visual impacts

The means to measure visual and character impacts is based on the combination of *sensitivity* of an area or a view and the *magnitude* (scale, character, distance) of the proposal. Further information on this is provided in section 2 of this document. This methodology is based upon work carried out in the UK entitled 'Guidelines for Landscape and Visual Impact Assessment' by The Landscape Institute and the Institute of Environmental Management and Assessment.

## 1.5 How landscape character and visual impact assessment is integrated with urban design policy

Urban design in the RTA describes both a process for producing good design outcomes and the product of that process. It addresses: how a project fits into an area; how it supports the local connections; and how it contributes to the quality of the public domain. Clearly landscape character and views are a significant part of these goals, but not the whole story.

Landscape character and visual impact assessment measures and reports on how well the design responds to people's views and how it fits into the landscape. It therefore provides an important feedback into the design development process.



*Figure 1-3 Visual and landscape character issues are but one of the goals of the RTA urban design policy 'Beyond the Pavement RTA urban design policy procedures and design principles' describes nine principles for good integrated engineering and urban design. Addressing views and landscape character are part of these principles but not the whole story.*

## 2 Assessment terminology

There can be confusion if consistent terminology is not applied. For example the words view, visual, visibility, aesthetics, character, urban design and landscape all have distinct meanings yet are often used in different ways in different reports. The following list of definitions should therefore be followed in the landscape character and visual impact assessment process.

<i>Aesthetics</i>	Relating to the sense of the beautiful or science of aesthetics ie the deduction, from nature and taste, the rules and principles of beauty.
<i>Landscape</i>	A tract of land. Taken to mean a prospect or piece of scenery or land. Landscape includes buildings, villages, towns, cities and infrastructure. The term is also used as shorthand for vegetation either planted, seeded or existing.
<i>Landscape architecture</i>	A profession involved with the assessment, design and management of the built, natural and community environment.
<i>Landscape character</i>	The aggregate of built, natural and cultural aspects that make up an area and provide its unique sense of place. Landscape in this context is taken to include all aspects of a tract of land - the built, planted and natural topographical and ecological features.
<i>Landscape character zone</i>	An area of the landscape with similar properties or strongly defined spatial qualities.
<i>Magnitude</i>	The scale, form and character of a development proposal. In the case of visual assessment also how far the proposal is from the viewer. Combined with sensitivity, magnitude provides a measurement of impact.
<i>Sensitivity</i>	The sensitivity of a landscape character zone or view and its capacity to absorb change. Combined with magnitude, sensitivity provides a measurement of impact.
<i>Urban design</i>	Urban design in the RTA is the process where projects are designed so that they: fit sensitively with the built natural and community environment; contribute to the functioning of the community; and contribute to the quality of the public domain for the community and road users. Architects, engineers, environmental experts, landscape architects, planners and urban designers are all practitioners in the process of urban design. Urban designers are generally landscape architects and architects that have extended their expertise into the field of urban design.
<i>VEM</i>	Visual Envelope Map also referred to as 'viewshed' or zone of visual influence. It is the area within which a project can be seen at eye level above ground. It usually excludes the blocking effect of buildings and minor stands of vegetation and therefore represents a visual catchment greater than actual.
<i>View</i>	The sight or prospect of some landscape or scene.
<i>Visibility</i>	The state or fact of being visible or seen.
<i>Visual impact</i>	The impacts on the views from residences and other public places.



### 3 When to carry out landscape character and visual impact assessment

The following diagram sets down when the landscape character and visual impact assessment tasks should be carried out in the EIA process.

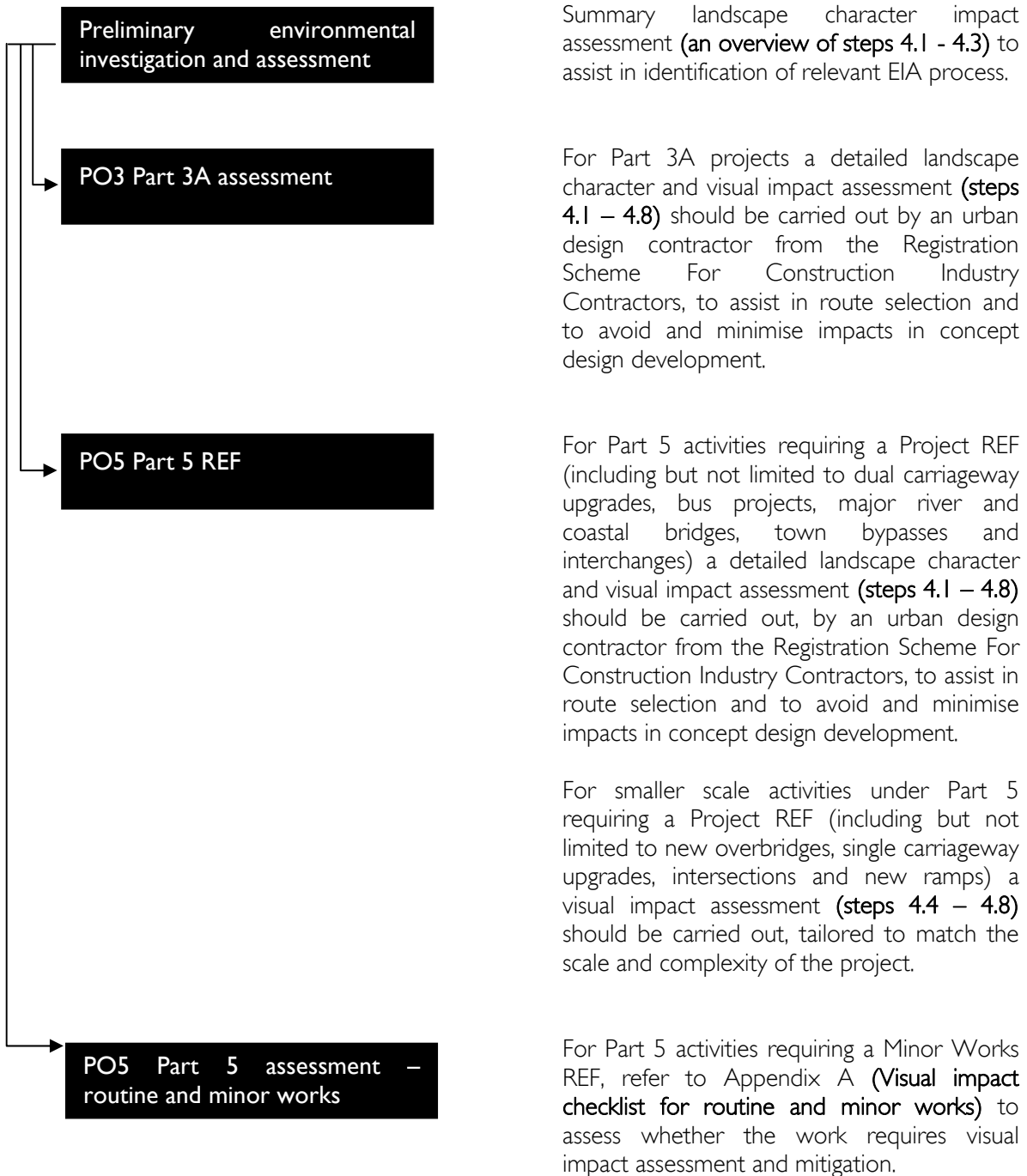


Figure 3-1 When to apply landscape character and visual impact assessment

## 4 Landscape character and visual impact assessment tasks

### 4.1 Analyse landscape character

Based on desk top and field analysis, the character of the study area should be assessed and described in text and images. The analysis should cover the following aspects and their combined effect.

- The planning designations of an area relating to landscape character, scenic quality and conservation whether federal, state or local.
- The topographical qualities of an area, whether it is hilly, rolling, flat, mountainous etc.
- The drainage of an area - the rivers, creeks, lakes and how these affect character.
- The geological quality of an area, whether it is rocky, alluvial, has deep or thin soils etc.
- The ecological characteristics and land cover of an area, whether it is forested, wetland, scrub, grass etc and the type of cover and dominant flora species
- The agricultural qualities of an area and how these contribute to character. For example dairy/ cane farming, forestry, wheat, and the types of field boundaries and farm structures.
- How the settlements (farms, villages towns cities) fit into their natural setting.
- The parks and open space in the settlements and the character and quality of these areas.
- The main cultural and recreational characteristics of an area - the parks, popular walks, meeting places, community features and cultural icons.
- The style of architecture, the materials, forms, historical mixes and design qualities.
- The spatial qualities of an area - how enclosed or open it is, as defined by ridge lines vegetation and built form.
- The infrastructure environment – the scale and pattern of rail, footpaths, roads, bridges, electricity pylons, dams etc. Also the style and form of boundaries, fences, walls, lighting and other associated infrastructure elements.
- Major economic or industrial features such as factories, quarries, business parks etc.



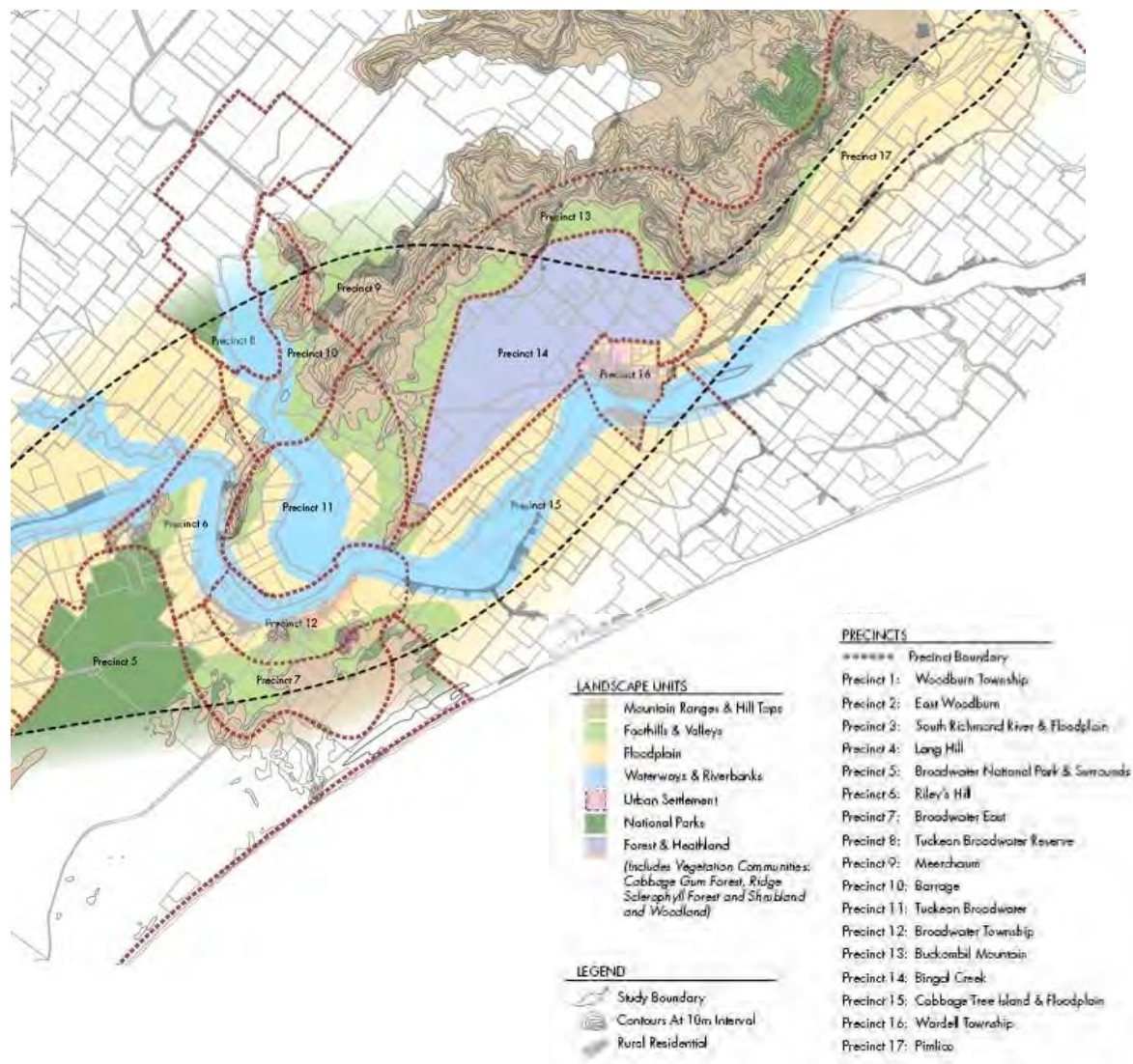
Figure 4-1 Landscape character should describe the natural setting, the human intervention and shaping of that setting - including the settlements within it - and the interaction between place and community.



## 4.2 Identify landscape character zones

If required due to the size or complexity of the project, the study area should be broken down into different character zones of broadly homogenous characteristics or strongly defined spatial qualities. For example ridgelines often divide the character of the landscape, built areas have a different character to rural, river landscapes differ from coastal landscape types.

The purpose of dividing the area into character zones is to make the assessment process easier to understand, more accurate and context sensitive.



*Figure 4-2 Landscape can be divided into character zones.*

*Dividing the landscape into zones (where appropriate), can assist in improving the design for each zone and provide a more accurate assessment of the impacts on different places.*

## 4.3 Assess landscape character impacts

The impact of the proposal on each character zone should be assessed. Impacts should be based on both the sensitivity of the character zone and magnitude of the proposal in that zone.

Sensitivity refers to how sensitive the character of the setting it is to the proposed change. For example a pristine natural environment will be more sensitive to change than an industrial area.

Magnitude refers to the nature of the project. For example a large interchange would have a very different impact on landscape character than a localised road widening.

The combination of sensitivity and magnitude will provide the rating of the landscape character impact. (see figure 4-6 for grading values)

		Magnitude					
		High	High to Moderate	Moderate	Moderate to Low	Low	Negligible
Sensitivity	High	High impact	High impact	Moderate-high	Moderate-high	Moderate	Negligible
	High to Moderate	High impact	Moderate-high	Moderate-high	Moderate	Moderate	Negligible
	Moderate	Moderate-high	Moderate-high	Moderate	Moderate	Moderate-low	Negligible
	Moderate to Low	Moderate-high	Moderate	Moderate	Moderate-low	Moderate-low	Negligible
	Low	Moderate	Moderate	Moderate-low	Moderate-low	Low impact	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Figure 4-6 Landscape character and visual impact grading matrix

A judgement must be made as to the quality and extent of the design solution in assessing magnitude and impact. Determining a low impact based on the assumption that the very highest quality design outcome will be achieved, could be unrealistic and misleading. However it is equally misleading to determine impacts based on the very worst outcomes. A balance must be found but it is usually better to err on the side of caution.



Figure 4-3 Assessing the landscape character impact of the basic concept design  
*Assessing a project based upon its likely detailed outcome is unwise. It is better to base the assessment on the broad conceptual aspects such as the alignment and form of the road in cutting, the location and form of bridges and the landscape at an early stage of growth. The impact of this work can then be mitigated by detailed design solutions.*

For the purposes of assessment, the basic project concept - its location, form and key elements designed in accordance with other similar recent projects and the RTA urban design guidelines – should be assessed. The residual impacts identified in the assessment would then be mitigated where possible, with the mitigation measures integrated into the concept design. This provides a more transparent approach differentiating between concept design work to avoid impacts and mitigation work to minimise impacts.



## 4.4 Assess the visibility of the proposal

The extent of the area that the proposal will be visible from should be defined. To do this a Visual Envelope Map (VEM) should be produced, illustrating the likely visual catchment of the project. The visual catchment should be primarily related to existing landform, however a description of the obscuring effect of vegetation and buildings should be included if appropriate.

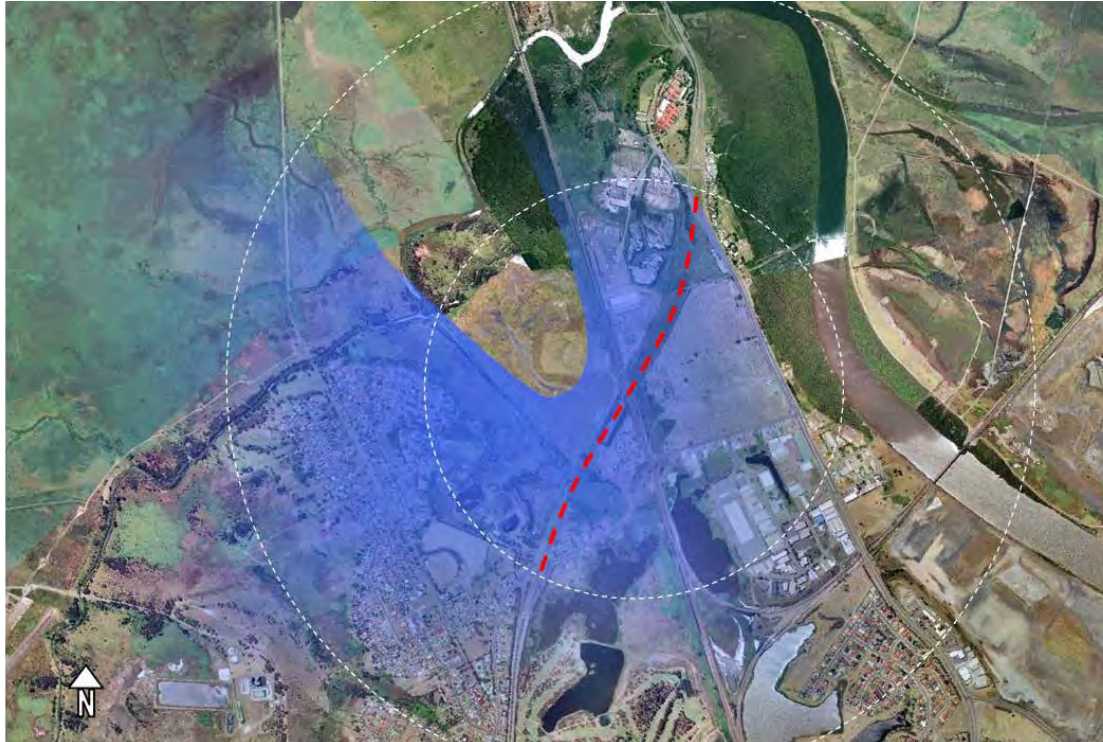


Figure 4-4 Visual Envelope Map (VEM)

## 4.5 Identify key viewpoints

In consultation with the project team, a schedule of viewpoints within reasonable distance of the project and within the visual catchment should be developed. These should include residential properties (grouped into areas if appropriate), public buildings (eg schools, places of worship, libraries, museums, galleries), public spaces (eg parks, plazas, popular walks, meeting places) and key businesses (eg hotels, restaurants, offices).

## 4.6 Assess visual impacts

The impact of the proposal on each viewpoint or group of viewpoints should be assessed. Impacts should be based on a composite of the sensitivity of the view and magnitude of the proposal in that view (see figure 4-6 for grading values).

Visual sensitivity refers to the quality of the view and how sensitive it is to the proposed change. Visual sensitivity is related to the direction of view, the composition of the view and may include more than one character zone. Magnitude refers to the nature of the project and its proximity to the viewer. For example, a development situated 1km from the viewpoint, will have a much reduced visual effect than one 100m away.

Again a judgement must be made as to the quality of design outcome in assessing magnitude and impact. As with character impacts a balance must be found.



**Figure 4-5 Assessing the visual impact of the basic concept design**

*Determining a low visual impact based on the assumption that a cutting will be clean exposed rock, or densely vegetated, could be misleading. A realistic impact should be ascribed based upon the cutting in its early stages of revegetation or with the possibility of the need for stabilisation works. Mitigation of such an impact would then focus on techniques to ensure a good vegetation cover, or well designed stabilisation work. It would be even better to use this feedback to minimise or avoid the need for the cutting entirely.*

The assessment of visual sensitivity and magnitude and the combined visual impact should be set down in a comprehensive schedule or table with descriptions and photographs to justify all analysis and conclusions. Animations, photomontages and sketches should be provided illustrating the final built outcome in its setting. Illustrations must be realistic and present the likely outcome rather than the desired 'ideal' outcome. In many cases sketches portray a more flexible appearance allowing changes to occur throughout the road development process.

#### **4.7 Refine the concept design to avoid and minimise landscape character and visual impacts**

Once an early understanding of the likely landscape character and visual impacts is established, feedback must be provided to the project design team so that measures to avoid or minimise the likely adverse impacts can be explored at an early enough stage to influence options selection and concept design. (Refer to 'Beyond the Pavement- urban design policy procedures and design principles' and associated guideline documents.)





**Figure 4-6 RTA urban design policy and guidance**  
*'Beyond the Pavement urban design policy procedures and design principles' and the suite of urban design guideline documents should inform the whole design process from options to implementation.*



**Figure 4-7 The difference between avoiding and mitigating impacts**  
*Locating the road alignment at the bottom of the hill and in redundant land alongside the rail line helped avoid landscape character and visual impacts. The residual noise impacts and the impacts of crossing the road still had to be mitigated but the mitigation measures of walls and bridges were well designed and integrated architecturally with the whole project.*

## 4.8 Develop a mitigation strategy to minimise landscape character and visual impacts

In collaboration with the design team, develop a strategy and principles to mitigate landscape character and visual impacts in the ongoing development of the design. Report on any impacts already avoided or minimised in the design process. Refer to 'Beyond the Pavement guideline documents on landscape, shotcrete, noise walls and bridges.

A mitigation strategy can range from a series of measures to screen visual impacts such as planting or mounding to particular design techniques to help integrate the proposal into its setting and make it visually attractive instead of jarring. All mitigation measures must be integrated with the overall design of the project.



**Figure 4-8 Mitigating impacts through good design**  
*The planting on the left behind the wall is 7 years old and was implemented to provide screening for an adjacent cemetery.*



*This fauna overpass - through its planting, proportions and use of local stone around the arches - has been designed to integrate with the forest setting and provide a visually acceptable element on the road corridor.*



**Figure 4-8 The value of endemic species**  
*Native species grow quickly, are hardy, tuned to the local climate and contribute to local biodiversity. This area, seeded less than 2 years before this photographic was taken, is now established and quickly developing into a valuable contribution to the forest.*



## 5 Combining landscape character and visual impact assessment with urban design reporting in environmental assessment documents

Landscape character and visual impact assessment is a part of the environmental assessment process, yet there are many commonalities with the RTAs urban design policy, a fact which is reflected in the need for similar professional involvement. For example:

- Landscape character and visual impact assessment reports on impacts, provides feedback into concept design development and sets strategies for ongoing design development.
- The analysis of landscape character and views also informs the contextual analysis stage of the urban design process.

Consequently reporting on the urban design work undertaken should be combined with landscape character and visual impact assessment reporting, to facilitate integration and cost efficiencies.

The following figure outlines a structure for the environmental assessment reporting in EA reports and REFs.

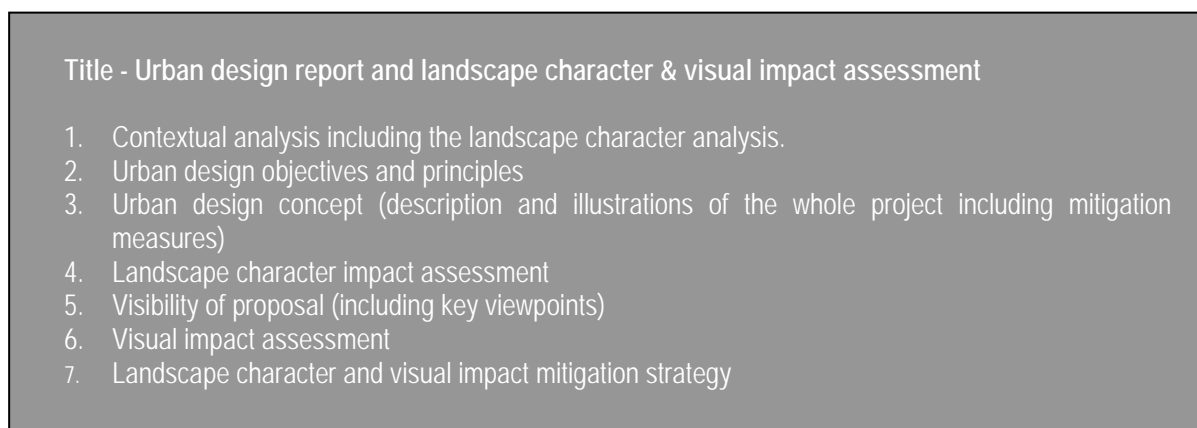


Figure 5-1 recommended structure for combined urban design and impact assessment report

## 6 Assessment checklist

For reviewers of the landscape character and visual assessment the following checklist should be of assistance:

1. Does the assessment of character portray a comprehensive impression in text and images of the character of the study area?
2. Are landscape character impacts distinct from visual impacts?
3. Are the impacts derived from an assessment of sensitivity and magnitude?
4. Are the ratings of sensitivity and magnitude and hence overall impact reasonable and consistent?
5. How has the impact assessment influenced the concept design? What design changes have been undertaken that will help avoid the need for costly mitigation?
6. Are the mitigation strategies clear, cost effective, integrated with the concept design (ie should appear as a seamless part of the project not an 'add on') and in accordance with RTA urban design guidelines?



## 7 References

Beyond the Pavement urban design policy, process and principles 2009

Bridge Aesthetics 2004

Shotcrete Design Guideline 2005

Noise Wall Design Guideline 2007

Landscape Design Guideline 2008

## 8 Definitions

EA report	Environmental Assessment report
EIAG	RTA Environmental Impact Assessment Guidelines
EIA	Environmental Impact Assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
REF	Review of Environmental Factors
VEM	Visual Envelope Map

## 9 Responsibilities

The Senior Manager Urban Design is responsible for ensuring that this information is maintained.

## 10 Related procedures, guidance notes and templates

### Reference documents:

RTA *Environmental Impact Assessment Guidelines*

### Contact details:

Senior Manager Urban Design

RTA Urban Design Section

02 8588 5780

Senior Environmental Specialist (Planning & Assessment)

RTA Environment Branch

02 8588 5726

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**Review date:** 24/03/11

# Appendix A

## Visual impact checklist for routine and minor works



The following checklist should be completed to ascertain whether a more detailed visual assessment should be carried out for projects assessed under Part 5 assessment – routine and minor works (P05-P01). If in doubt regarding the following questions consult the Urban Design Section.

### Visual impact checklist for routine and minor works

	Yes	No	N/A
Is the proposal adjacent to an important physical or cultural element or landscape? (heritage items and areas, distinctive or historic built form, National Parks, conservation areas, scenic highways etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the proposal obstruct or intrude upon the character or views of a valued landscape or urban area. For example local significant topography, a rural landscape or a park, a river lake or the ocean or a historic or distinctive townscape or landmark?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the proposal require the removal of mature trees or other significant stands of vegetation, either native or introduced?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the proposal result in large areas of shotcrete visible from the road or adjacent properties?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the proposal involve new noise walls or visible changes to existing noise walls?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the proposal involve the removal or reuse of large areas of road corridor landscape, either verges or medians?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the proposal involve significant changes to the appearance of a bridge (including piers, girders, abutments and parapets) that are visible from the road or residential areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If involving lighting, will the proposal create unwanted light spillage on residential properties at night?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Recommended actions

If any of the criteria are answered 'Yes', an attempt should be made to avoid the impact through amending the proposed design.

If avoidance is not possible, a visual impact assessment should be considered in consultation with a member of the Urban Design Section and carried out in accordance with sections 4.5 to 4.8 of this document.







Appendix L  
Greenhouse gas assessment





# Carbon Gauge



## Inputs

Key: 50 User Input    0 Calculated Cell      Cell not available for input

## Project Details

Project title	Alfords Point Road - southern approach upgrade		
Project location	Alfords Point	Country	Region
State	NSW	<input checked="" type="radio"/> Australia <input type="radio"/> NZ	<input type="radio"/> Rural <input checked="" type="radio"/> Urban
Brief description of the works e.g. (eg. new road, road duplication, road upgrade, intersection upgrade, etc)	Road upgrade		

## Construction

Estimated Value (\$m)		Large Project
Project Duration (Months)	24	

### Fuel Type

Fuel Type	Construction Activity	Fuel Type	Percentage of site vehicles using Petrol
Plant Equipment Fuel	Site Offices	Diesel	0%
	Construction	Diesel	
	Demolition and Earthworks	Diesel	
	Vegetation Removal	Diesel	

### Pavements

Pavement types	Pavement area (m <sup>2</sup> )
Pavement 1	01. Full Depth Asphalt    16,230



Pavement 2	07. Concrete footpaths	7,670
Pavement 3	03. Granular with Spray Seal	37,100
Pavement 4	01. Full Depth Asphalt	0
Pavement 5	01. Full Depth Asphalt	0
Pavement 6	01. Full Depth Asphalt	0

### Structures

	Type	Total Length (km)	Width (m)	Height (m)
Bridges (including interchanges and overpasses)	Bridge constructed using precast reinforced concrete beams	0	0	
	Bridge constructed using steel beams	0	0	
Reinforced Soil Walls	Reinforced Soil Walls	0		0
Retaining Walls	Concrete retaining walls	0		0
	Timber retaining walls	0		0
	Rock retaining walls	0.15		5

### Drainage

		Total Length (km)
Kerbing	Median Kerb, Type 2	2
	Median Kerb, Type 5	0
	Upright kerb and Gutter (Channel)	0
	Invert drain	0
Culverts – pipes or box culverts for water drainage	Small <450 RCP	0.2
	Medium 450 – 750 RCP	0
	Large 750 – 1200 RCP	0
	375x 600 RCBC	0
	600 x 1200 RCBC	0
Open, Unlined Drains	Form open, unlined drains	0.5

### Road Furniture

		Total Length (km)
Road Safety Barriers	Wire rope barrier	0
	W-beam barrier	0
	F-type (New Jersey) barrier	5.08
Noise Walls	Reinforced concrete wall	
	Hebel noise wall	
	Timber wall	
	Steel plate wall	

### Material Transport

Only include materials being transported more than 200km

	Pavements	Structures	Drainage	Road Furniture	Truck Size per Load of Material (GVM)	Distance from source to site (km)
Aggregate						
Asphalt & Bitumen						
Cement and Concrete						
Steel						
Timber						

### Earthworks

Earthwork Types	Total Volume (m <sup>3</sup> )
Strip and respread topsoil	265
Cut to spoil	19,720
Cut to fill	1,215
Import and place filling	4,440

### Demolition

Buildings	Quantity demolished (Number of buildings)
Houses	
Small commercial	
Medium commercial	
Large commercial	

### Vegetation Removal

Vegetation Type	Area cleared (m <sup>2</sup> )	Previously disturbed by human activity?
Grasslands	0	<input checked="" type="checkbox"/> YES
Low shrubs	23,600	<input type="checkbox"/> YES
High shrubs and medium dense tress <10m	23,000	<input checked="" type="checkbox"/> YES
Dense mature forest	0	<input type="checkbox"/> YES
Sequestered Carbon	Average annual rainfall (mm)	0



## Construction Report

**Note 1:** This Workbook is designed to enable a consistent methodology for the assessment of significant emission sources and estimation of greenhouse gas emissions. As such it deliberately does not cover activities and emission sources assessed as insignificant, and it is not designed for compliance reporting.

**Note 2:** All emission values shown on this report are in tonnes of carbon dioxide equivalent (t CO<sub>2</sub>-e) unless otherwise stated.

### Project Description

Project title	Alfords Point Road - southern approach upgrade
Project location	Alfords Point
State	NSW
Description	Road upgrade

Project Value (\$m)	
Project Duration (Months)	24

### Construction

#### Materiality Checklist Options

Checklist Option	Selection	Details
Will a diesel generator be used to provide power to the project site office for more than 12 months?	YES	Fuel combusted in powering site offices will be included.
Will more than 120 buildings be required to be demolished per 1km of road?	NO	Fuel combusted in demolishing buildings will NOT be included.
Will more than 0.6 m <sup>2</sup> of vegetation be removed per m <sup>2</sup> of pavement?	YES	Vegetation removal and/or revegetation will be included.
Will the project involve tunnelling?	NO	Electricity consumption and explosives used will NOT be included.
Is the project located more than 200 km from the nearest material suppliers/quarry/city?	NO	The emissions associated with the transport of materials to site will NOT be included.
Will the project utilise on-site batching plants or other continuously operating stationary plant and equipment for more than 6 months?	NO	Fuel combusted in stationary engines will NOT be included.
Will the project include road safety barriers along more than 50% of the road length if barriers are used on both sides of a dual carriageway (i.e. 4 sets) or 100% of the road length if used on both side of a single carriageway (i.e. two sets)?	YES	The emissions from the construction and installation of road safety barriers will be included.
Will the project include noise walls along more than 75% of the road length?	NO	The emissions from the construction and installation of noise walls will NOT be included.

### Fuel Types

	Construction Activity	Fuel Type	GHGe (t CO <sub>2</sub> -e)
Plant Equipment Fuel	Site Offices	Diesel	450
		Petrol	-
	Construction	Diesel	1,215
	Demolition and Earthworks	Diesel	277
	Vegetation Removal	Diesel	20
			<b>1,962</b>

### Pavements

	Pavement Type	Total Area (m <sup>2</sup> )	GHGe (t CO <sub>2</sub> -e)
Pavement 1	01. Full Depth Asphalt	16,230	610
Pavement 2	07. Concrete footpaths	7,670	73
Pavement 3	03. Granular with Spray Seal	37,100	890
Pavement 4	01. Full Depth Asphalt	-	-

Pavement 5	01. Full Depth Asphalt	-	-
Pavement 6	01. Full Depth Asphalt	-	-
			<b>1,574</b>

## Structures

	Structure Type	Total Length (km)	Width/Height (m)	GHGe (t CO <sub>2</sub> -e)
Bridges (including interchanges and overpasses)	Bridge constructed using precast reinforced concrete beams	-	-	-
	Bridge constructed using steel beams	-	-	-
Reinforced Soil Walls	Reinforced Soil Walls	-	-	-
Retaining Walls	Concrete retaining walls	-	-	-
	Timber retaining walls	-	-	-
	Rock retaining walls	0.15	5.0	9
				<b>9</b>

## Material Transport

	Truck Size per Load of Material (GVM)	Distance from source to site (km)	GHGe (t CO <sub>2</sub> -e)
Aggregate		-	-
Asphalt & Bitumen		-	-
Cement and Concrete		-	-
Steel		-	-
Timber		-	-
			<b>-</b>

## Drainage

	Drainage Type	Total Length (km)	GHGe (t CO <sub>2</sub> -e)
Kerbing	Median Kerb, Type 2	2.00	25
	Median Kerb, Type 5	-	-
	Upright kerb and Gutter (Channel)	-	-
	Invert drain	-	-
Culverts – pipes or box culverts for water drainage	Small <450 RCP	0.20	26
	Medium 450 – 750 RCP	-	-
	Large 750 – 1200 RCP	-	-
	375x 600 RCBC	-	-
	600 x 1200 RCBC	-	-
Open, Unlined Drains	Form open, unlined drains	0.50	1
			<b>51</b>

## Road furniture

	Road Furniture Type	Total Length (km)	GHGe (t CO <sub>2</sub> -e)
Road Safety Barriers	Wire rope barrier	-	-
	W-beam barrier	-	-
	F-type (New Jersey) barrier	5.08	1,174
Noise Walls	Reinforced concrete wall	-	-
	Hebel noise wall	-	-
	Timber wall	-	-
	Steel plate wall	-	-
			<b>1,174</b>

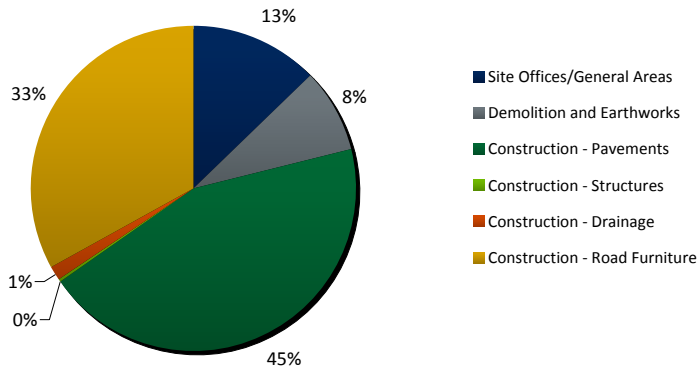
## Greenhouse Gas Emissions

<b>Scope 1 emissions</b>	Emissions released into the atmosphere as a direct result of an activity, or series of activities (including ancillary activities) that constitutes the facility.
<b>Scope 2 emissions</b>	Emissions released as a result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that do not form part of the facility.
<b>Scope 3 emissions</b>	Emissions that occur outside the site boundary of a facility as a result of activities at a facility that are not Scope 2 emissions.

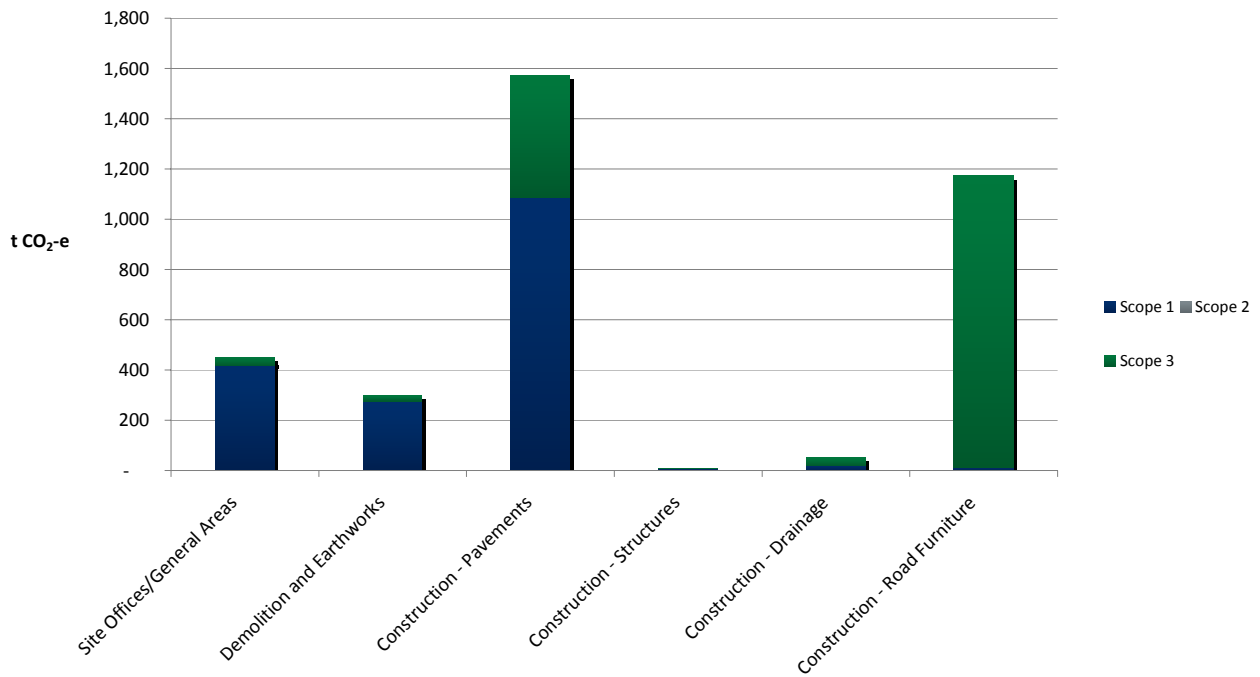
## Greenhouse Gas Emissions Summary by Activity



**GHGe Summary by Activity**

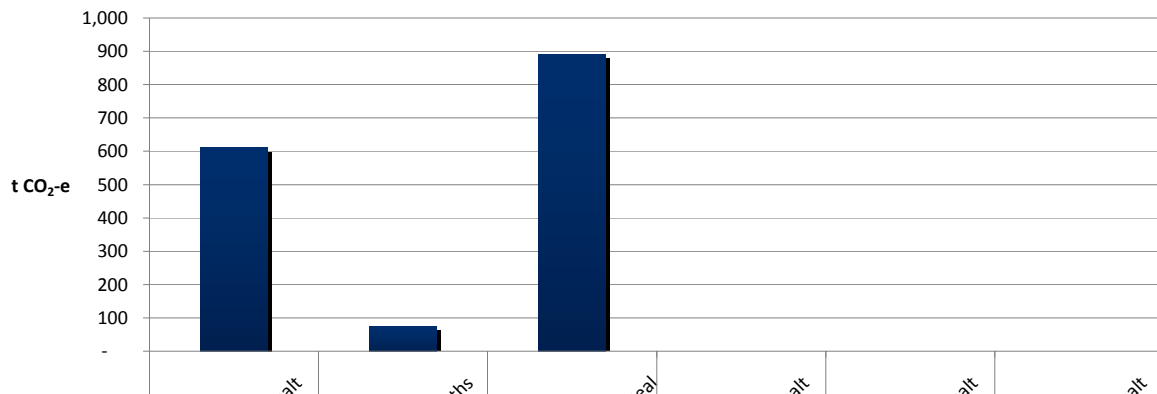


**GHGe Summary by Activity**



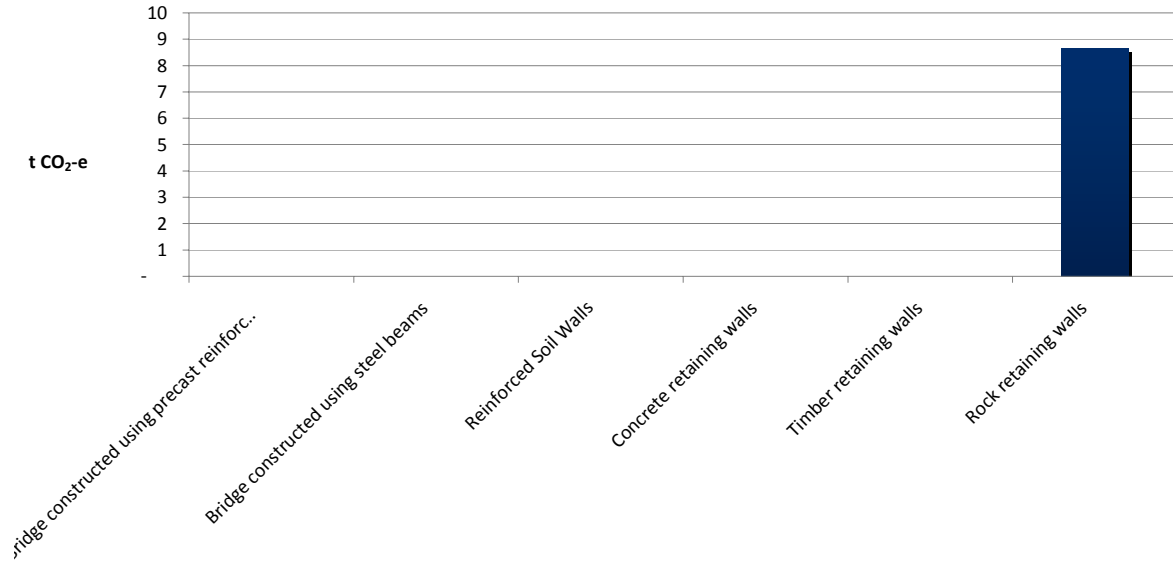
**Greenhouse Gas Emissions Summary by Emissions Source**

**GHGe Summary by Emissions Source - Pavements**

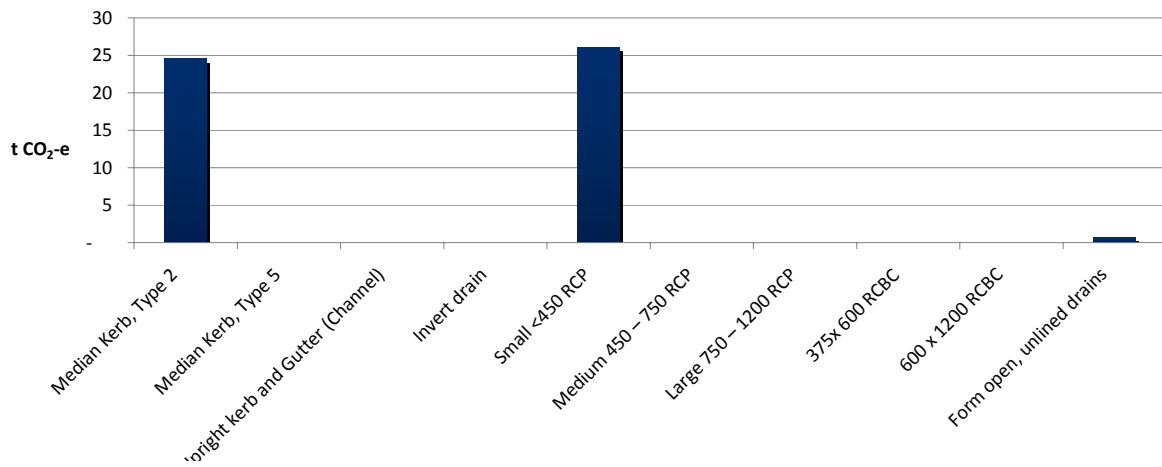


01. Full Depth Asphalt	07. Concrete footpaths	03. Granular with Spray Seal	01. Full Depth Asphalt	01. Full Depth Asphalt	01. Full Depth Asphalt
Pavement 1	Pavement 2	Pavement 3	Pavement 4	Pavement 5	Pavement 6

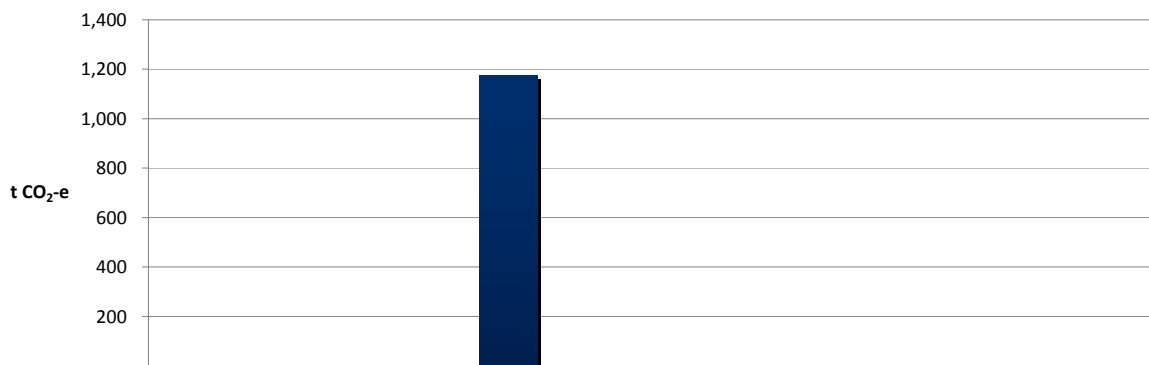
**GHGe Summary by Emissions Source - Structures**



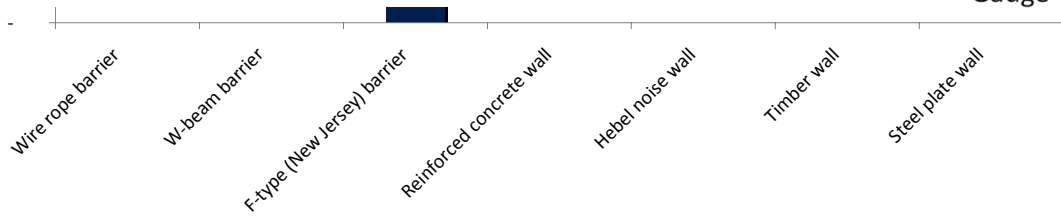
**GHGe Summary by Emissions Source - Drainage**



**GHGe Summary by Emissions Source - Road Furniture**

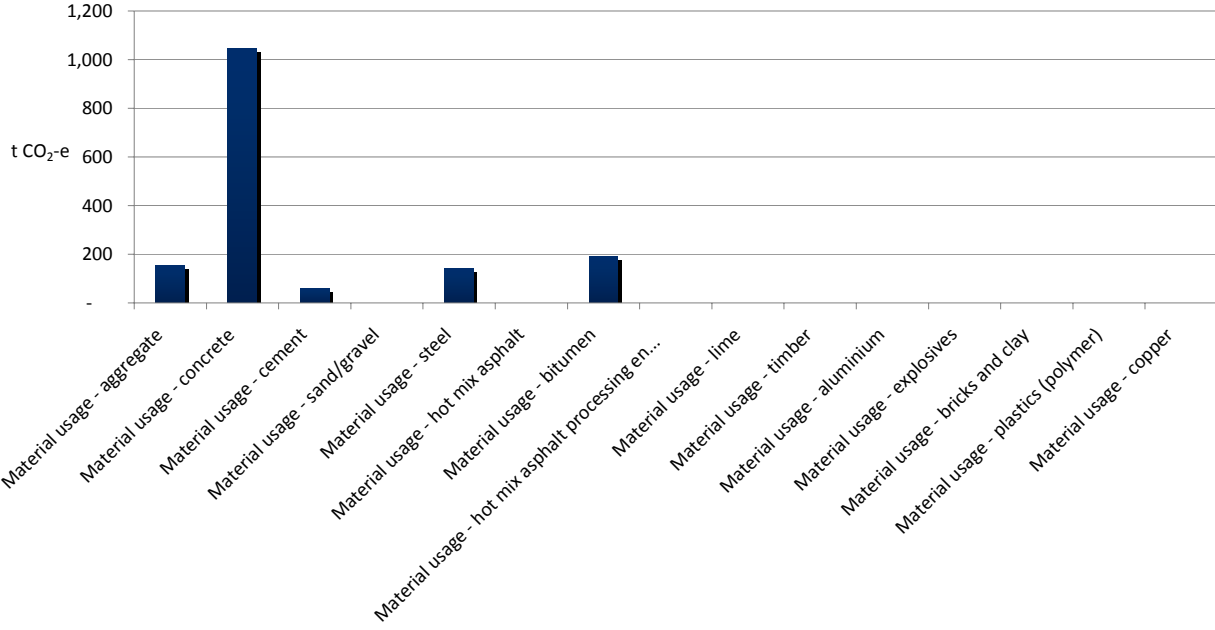






Materials

GHGe by Materials Totals



**GHG Summary - Construction**

**Note:** This Workbook is designed to enable a consistent methodology for the assessment of significant emission sources and estimation of greenhouse gas emissions. As such it deliberately does not cover activities and emission sources assessed as insignificant, and it is not designed for compliance reporting.

<b>Scope 1 emissions</b>	Emissions released into the atmosphere as a direct result of an activity, or series of activities (including ancillary activities) that constitutes the facility.
<b>Scope 2 emissions</b>	Emissions released as a result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that do not form part of the facility.
<b>Scope 3 emissions</b>	Emissions that occur outside the site boundary of a facility as a result of activities at a facility that are not Scope 2 emissions.

**GHGe Summary by activity**

	Scope 1	Scope 2	Scope 3	Total
Site Offices/General Areas	418	-	32	450
Demolition and Earthworks	276	-	21	297
Construction - Pavements	1,087	-	486	1,574
Construction - Structures	8	-	1	9
Construction - Drainage	21	-	31	51
Construction - Road Furniture	13	-	1,161	1,174
<b>Total</b>	<b>1,823</b>	<b>-</b>	<b>1,732</b>	<b>3,554</b>

**GHGe Summary by emission source - Construction**

	Scope 1	Scope 2	Scope 3	Total
Fuel combustion - electricity generation	199	-	15	215
Fuel combustion - site vehicles	219	-	17	235
Fuel combustion - plant & equipment	1,129	-	86	1,215
Fuel combustion - demolition and earthworks	257	-	20	277
Fuel combustion - vegetation removal	19	-	1	20
Vegetation removal - lost carbon sink			-	-
Electricity consumption - demolition and earthworks				-
Electricity consumption - construction				-
Transportation of vegetation offsite				-
Tunnelling equipment				-
Material usage - aggregate			155	155
Material usage - concrete			1,047	1,047
Material usage - cement			60	60
Material usage - sand/gravel			-	-
Material usage - steel			140	140
Material usage - hot mix asphalt			-	-
Material usage - bitumen			190	190
Material usage - hot mix asphalt processing energy			-	-
Material usage - lime			-	-
Material usage - timber			-	-
Material usage - aluminium			-	-
Material usage - explosives			-	-
Material usage - bricks and clay			-	-
Material usage - plastics (polymer)			-	-
Material usage - copper			-	-
Other				-
<b>Total</b>	<b>1,823</b>	<b>-</b>	<b>1,732</b>	<b>3,554</b>

**Site Offices/General Areas**

	Scope 1	Scope 2	Scope 3	Total
Fuel combustion - electricity generation	199	-	15	215
Fuel combustion - site vehicles	219	-	17	235
Other				-
<b>Total</b>	<b>418</b>	<b>-</b>	<b>32</b>	<b>450</b>

**Demolition and Earthworks**

	Scope 1	Scope 2	Scope 3	Total
Fuel combustion - demolition plant & equipment	-		-	-
Fuel combustion - vegetation removal plant & equipment	19		1	20
Fuel combustion - earthworks plant & equipment	257		20	277
Transport of vegetation off site				-
Vegetation removal - lost carbon sink	-			-
Electricity consumption (tunnels only)				-
Tunnelling equipment				-
Other				-
<b>Total</b>	<b>276</b>	<b>-</b>	<b>21</b>	<b>297</b>

<b>Construction - pavements</b>		<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>	<b>Total</b>
Materials - 01. Full Depth Asphalt		-	-	237	237
Materials - 07. Concrete footpaths		-	-	0	0
Materials - 03. Granular with Spray Seal		-	-	165	165
Materials - 01. Full Depth Asphalt		-	-	-	-
Materials - 01. Full Depth Asphalt		-	-	-	-
Materials - 01. Full Depth Asphalt		-	-	-	-
<b>Materials Total</b>		-	-	403	403
Energy - 01. Full Depth Asphalt		346	-	26	373
Energy - 07. Concrete footpaths		68	-	5	73
Energy - 03. Granular with Spray Seal		673	-	51	725
Energy - 01. Full Depth Asphalt		-	-	-	-
Energy - 01. Full Depth Asphalt		-	-	-	-
Energy - 01. Full Depth Asphalt		-	-	-	-
<b>Energy Total</b>		1,087	-	83	1,170
Transport of material to site		-	-	-	-
Other		-	-	-	-
Other		-	-	-	-
<b>Pavements Total</b>		1,087	-	486	1,574

<b>Construction - structures</b>		<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>	<b>Total</b>
Materials				-	-
Energy		8		1	9
Transport of material to site				-	-
<b>Structures Total</b>		8	-	1	9

<b>Construction - drainage</b>		<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>	<b>Total</b>
Materials				29	29
Energy		21		2	22
Transport of material to site				-	-
<b>Drainage Total</b>		21	-	31	51

<b>Construction - road furniture</b>		<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>	<b>Total</b>
Materials				1,160	1,160
Energy		13		1	14
Transport of material to site				-	-
<b>Road Furniture Total</b>		13	-	1,161	1,174



**Material Summary - Construction**

**Note:** This Workbook is designed to enable a consistent methodology for the assessment of significant emission sources and estimation of greenhouse gas emissions. As such it deliberately does not cover activities and emission sources assessed as insignificant, and it is not designed for compliance reporting.

<b>Material Totals (t)</b>	Pavements	Structures	Drainage	Road Furniture	Total
Aggregate	38,282	-	614	-	<b>38,896</b>
Aluminium	-	-	-	-	-
Asphalt & Bitumen	301	-	-	-	<b>301</b>
Bricks/Clay	-	-	-	-	-
Cement and Concrete	75	-	216	8,027	<b>8,318</b>
Copper	-	-	-	-	-
Explosives	-	-	-	-	-
Plastic (Polymer)	-	-	-	-	-
Rubber	-	-	-	-	-
Steel	0	-	-	64	<b>64</b>
Timber	-	-	-	-	-
<b>Total</b>	<b>38,659</b>	-	<b>830</b>	<b>8,091</b>	<b>47,580</b>

<b>Fuel Totals (kL)</b>	Site offices	Construction	Demolition and earthworks	Vegetation removal	Total
Biodiesel (B10)	-	-	-	-	-
Biodiesel (B20)	-	-	-	-	-
Diesel	156	421	96	7	<b>680</b>
Fuel Oil	-	-	-	-	-
Kerosene	-	-	-	-	-
LPG	-	-	-	-	-
Unleaded Petrol	-	-	-	-	-
<b>Total</b>	<b>156</b>	<b>421</b>	<b>96</b>	<b>7</b>	<b>680</b>

<b>Material Transport GHGe (t CO<sub>2</sub>-e)</b>	Pavements	Structures	Drainage	Road Furniture	Total
Aggregate					
Asphalt & Bitumen					
Cement and Concrete					
Steel					
Timber					
<b>Total</b>					