11. LANDSCAPE AND VISUAL IMPACT ASSESSMENT

11.1 Introduction

The aim of this Section of the Report is to outline the landscape baseline conditions, visually sensitive receivers (VSRs) and identify the impacts which may occur to these on construction of the southern section of the Route 10 (NLYLH) alignment.

11.2 Standards and Legislation

The methodology for undertaking the landscape and visual impact assessment is in general accordance with *Annex 18* of the Technical Memorandum to the Environmental Impact Assessment Ordinance (EIAO). The main elements of the assessment are given below.

The Landscape and Visual Impacts are considered as follows:

- landscape impact assessment shall assess the source and magnitude of developmental effects on the existing landscape elements, character and quality in the context of the site and its environs; and
- visual impact assessment shall assess the source and magnitude of effects caused by the proposed development on the existing views, visual amenity, character and quality of the visually sensitive receivers within the context of the site and its environs.

These are evaluated in accordance with *Annex 10* of the Technical Memorandum to the EIAO.

11.3 Landscape Impact Assessment Methodology

This methodology is based on *Annexes 10* and *18* of the TM to the EIAO and on the Guidelines for Landscape and Visual Impact Assessment, The Landscape Institute and Institute of Environmental Assessment. The assessment of the potential impacts of a proposed scheme on the existing landscape comprises two distinct sections:

- baseline survey; and
- potential landscape impacts assessment.

A baseline survey of the existing landscape character and quality has been undertaken from site inspections and desk-top surveys. Landscape elements considered include:

- local topography;
- woodland extent and type;
- other vegetation types;
- built form;
- patterns of settlement;
- land use;
- scenic spots;
- details of local materials, styles, streetscapes, etc.;

- prominent watercourses; and
- cultural and religious identity.

Confirmed developments either within the study area or adjacent to it are also considered. The baseline survey will form the basis of the landscape context by describing broadly homogenous units of similar character. The landscape character is rated low, medium or high depending not only on the quality of elements present but also their sensitivity to change and local or regional importance. The quality of the landscape is not only related to its visual amenity.

The assessment of the potential landscape impacts of the proposals will result from:

- identification of the sources of impact, and their magnitude, that would be generated during construction and operation of the scheme; and
- identification of the principal landscape impacts, primarily in consideration of the degree of change to the baseline conditions, the impacts are considered systematically in terms of the landscape elements, the site and its context.

The overall landscape impact is a product of the following factors:

- the landscape character and its quality;
- source, nature and magnitude of potential impacts;
- the degree of change caused by each of the impacts to the existing landscape;
- tolerance of the landscape to absorb the change;
- significance of this change in consideration of the local and regional areas and other developments;
- cumulative effects on the landscape of this and neighbouring proposals; and
- identification of plant species of significant value which should be conserved.

The sensitivity / quality of the landscape will be assessed as follows:

- High: e.g. important components or landscape of particularly distinctive character susceptible to relatively small changes;
- Medium: e.g. a landscape of moderately valued characteristics reasonably tolerant to change; and
- Low: e.g. a relatively unimportant landscape, the nature of which is potentially susceptible to change.

The magnitude of the change in the landscape is as follows:

- High: notable change in the landscape characteristics over an extensive area ranging to very intensive change over a more limited area;
- Medium: moderate changes in a localised are: and
- Low: virtually imperceptible change in any components.

The degree of impact is considered as follows:

Adverse / Beneficial Impacts			
Significant: adverse/beneficial impact where the proposal would cause significant deterioration or improvement in existing landscape quality	Moderate: adverse/beneficial impact where the proposal would cause a noticeable deterioration or improvement in existing landscape quality	Slight: adverse/beneficial impact where the proposal would cause a barely perceptible deterioration or improvement in the existing landscape quality	Negligible: no discernible change in the existing landscape quality.

The analysis of the degree of impact is based on the following matrix:

Magnitude of Change	High	*Moderate Impact*	*Moderate / Significant Impact*	*Significant Impact*
	Medium	*Slight / Moderate Impact*	*Moderate Impact*	*Moderate / Significant Impact*
	Low	*Slight Impact*	*Slight / Moderate Impact*	*Moderate Impact*
		Low	Medium	High
		Sensitivity / Quality		

The above matrix will apply in the assessment of the majority of situations, however, in certain cases a deviation form this may occur, e.g. the impact may be so major that a significant impact may occur to a low quality element.

11.4 Visual Impact Assessment Methodology

The assessment of the potential visual impact of the scheme comprises two distinct parts:

- baseline survey; and
- visual impact assessment.

The baseline survey of all views towards the proposals is undertaken by identifying:

- the visual envelope or visual zone within which the proposed development may be contained either wholly or partially within views, this must also include indirect effects such as offsite construction activities; and
- the visually sensitive receivers (VSRs) within the visual envelope whose views will be affected by the scheme, the potential receivers are considered as three groups:

  (a) views from residences - the most sensitive of receivers due to the high potential of intrusion on the visual amenity and quality of life,
  (b) view from workplaces - less sensitive than above due to visual amenity being less important within the work environment, and;

(c) views from public areas - including all areas apart from the above, e.g., public parks, recreation grounds, footpaths, roads, etc. Sensitivity of this group depends on the transitory nature of the receiver, e.g. sitting in a park or travelling on a highway. Also considered is the degree of view or glimpsed views.

The sensitivity of each group is also influenced by its location and direction of view relative to the scheme. Typical viewpoints from within each of the visually sensitive groups are identified and their views described. Both present and future visually sensitive receivers will be considered.

The sensitivity / quality is based on the following:

- High: e.g. residential properties;
- Medium: e.g. sporting facilities or partially screened views; and
- Low: e.g. industry.

The baseline survey will form the basis of the visual character and quality of the site. The assessment of the potential visual impacts will result from:

- identification of the sources of visual impacts, and their magnitude, that would be generated during construction and operation of the scheme; and
- identification of the principal visual impacts primarily in consideration of the degree of change to the baseline conditions.

The impact assessment will relate to the typical viewpoints within the visual receiver group, as identified previously, and their existing and potential views subsequent to the scheme development. The visual impact will result from consideration of the following:

- character of existing view;
- quality of existing view;
- context, location and distance of the visually sensitive receiver;
- visual receiver group sensitivity;
- number of viewers at visually sensitive receiver group;
- degree of change to existing views;
- other views available to visual receiver group; and
- the cumulative effects on views of this and other neighbouring developments.

The magnitude of change to the views is classified as follows:

- High: e.g. the majority of viewers affected / major changes in view;
- Medium: e.g. many viewers affected / moderate change in view; and
- Low: e.g. few viewers affected / minor change in view.

The degree of visual impact is rated in a similar fashion to the landscape impact, i.e. significant, moderate, slight and negligible. The impacts may be beneficial or adverse.

Adverse / Beneficial Impacts			
Significant: adverse/beneficial impact where the proposal would cause significant deterioration or improvement in existing landscape quality	Moderate: adverse/beneficial impact where the proposal would cause a noticeable deterioration or improvement in existing landscape quality	Slight: adverse/beneficial impact where the proposal would cause a barely perceptible deterioration or improvement in the existing landscape quality	Negligible: no discernible change in the existing landscape quality.

The analysis of the degree of impact is based on the following matrix:

Magnitude of Change	High	*Moderate Impact*	*Moderate / Significant Impact*	*Significant Impact*
	Medium	*Slight / Moderate Impact*	*Moderate Impact*	*Moderate / Significant Impact*
	Low	*Slight Impact*	*Slight / Moderate Impact*	*Moderate Impact*
		Low	Medium	High
		Sensitivity / Quality		

11.5 Mitigation Measures

The identification of the landscape and visual impacts will highlight those sources of conflict requiring design solutions or modifications to reduce the impacts, and if possible, blend the development and associated activities in with the surrounding landscape. These mitigation measures should take into account factors including:

- woodland, tree and shrub planting of new or disturbed slopes, amenity strips and areas, central reservations and adjacent to any new structures;
- consideration of the contouring of new slopes in order to blend them in with the existing topography;
- earth mounding and screening, structural or vegetated;
- highlighting unacceptable impacts and considering alternative scheme proposals;
- treatment of structural forms;
- hard landscape, furniture and other landscape; and
- significant landscape elements.

This will result in the formation of landscape mitigation proposals which will alleviate the previously identified landscape and visual impacts as far as possible.

11.6 Residual Impacts

The Residual Impacts are those which remain after the proposed mitigation measures have been implemented. This is often 10 to 15 years after the proposed scheme has been open to normal operation when the soft landscape mitigation measures are deemed to have reached a level of maturity which allows them to perform their original design objectives.

The level of impact is derived from the degree or magnitude of change which the proposals will cause to the view which would have existed during this period if the proposed scheme had not been constructed and its ability to tolerate change, i.e. its quality and sensitivity taking into account the beneficial effects of the proposed mitigation.

The levels of significance are considered as follows:

Beneficial	Acceptable	Acceptable with mitigation	Unacceptable	Undetermined
The project will complement the landscape and visual character of its setting, will follow the relevant planning objectives and will improve overall and visual quality.	There will be no significant effects on the landscape, no significant visual effects caused by the appearance of the project, or no interference with key views.	There some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures.	The adverse effects are considered too excessive and would not be reduced to an acceptable level by mitigation.	Significant adverse effects are likely but the extent to which they may occur or may be mitigated cannot be determined from the study. Further detailed study will be required for the specific effects in question.

11.7 Baseline Conditions and Impacts

Route 10 (NLYLH) is considered in four sections, as follows:

- North Lantau;
- Tsing Lung Bridge;
- Tsing Lung Tau to Siu Lam; and
- Siu Lam to So Kwun Wat.

For simplicity, the landscape and visual impact assessment has been considered for each of the sections individually. Several LCUs and VSRs are referred to within more than one section. This reflects the impacts caused by differing sections of the road to the sensitive receivers described.

The following describes the overall existing landscape and visual context and the impacts that are likely to be caused by Route 10 (NLYLH) in each of the above sections. *Table 11.1* details the Landscape Analysis and Impact Assessment and is supported by *Figures 11.1 to 11.9. Table 11.2* details Analysis of Visually Sensitive Receivers and Impact Assessment and is supported by *Figures 11.10* to *11.23.*

A visual envelope has been formulated which broadly indicates the extent of the zone of visual influence of the proposed scheme.

Construction Impacts

During the construction period many of the impacts will be similar to longer-term impacts, i.e. the introduction of the roads, and viaducts, and the requirement for extensive new slopes adjacent. The works areas required for these is generally limited to the area of the road or slopes. Many of the landscape and visual impacts in these locations will arise from the presence of the works themselves, e.g. the appearance of the landscape visually changing, exposure of earthworks and rock slopes, and works traffic. These types of impacts will be similar in their context as the operational impacts of the scheme in the early period after completion and are thus similar to those described in the main impact assessment.

Major impacts during the construction period may arise, however, from temporary works areas, contractor compounds or borrow areas located along the route. These will be cleared areas and will cause additional short-term, and potentially long-term, landscape and visual impacts. The additional impacts caused by these types of construction requirements are described individually within each of the sections below.

11.8 North Lantau Section

Existing Landscape and Visual Resources

The north-eastern region and shoreline of Lantau Island is essentially undisturbed except for the areas of reclamation and earthworks around the western landfall of the Kap Shui Mun (KSM) Bridge, and the North Lantau Highway. The natural landform is steeply sloping with narrow stream and river valleys leading to small natural inlets. The hillside vegetation is characterised by natural grass and low scrub with trees growing in the sheltered valleys.

To the south of this section of the study area are the valleys of Fa Peng and Tso Wan which contain clusters of rural village settlements. Local walking trails over the hillsides connect these villages to Penny's Bay and North Lantau. To the north is the Ng Kwu Leng headland, an area of undisturbed hillside. The shoreline in the study area comprises steep exposed rock outcrops between the vegetated hillside and the water. Except around the Kap Shui Mun Bridge and the reclaimed area at Tai Chuen, the area has a low level of disturbance to its natural landscape features resulting in a landscape quality which is high.

The shoreline south of the Kap Shui Mun (KSM) Bridge is visible from north-west Tsing Yi and by marine traffic using the Ma Wan and Kap Shui Mun Channels. Much of the northern areas, around Ng Kwu Leng, are natural hillside and coastline, the site is clearly visible from the relocated village on Ma Wan Island, the Ma Wan Channel, Sham Tseng, Hong Kong Garden and adjacent villages and the possible low-rise development on the R(C) site. As such it is an important landscape feature on the northern extremity of Lantau Island and has a high landscape and visual quality.

Additional Construction Impacts

Two contractor compounds are proposed within this section. One is located on the small headland between Tso Wan and Fa Peng, and the other on existing reclamation and disturbed area to the north of the Kap Shui Mun Bridge. The former will be the future site of the toll plaza and the administration building so will not cause additional temporary landscape impacts. However, the local villages will experience visual impacts during the construction period due to unsightly construction works, works traffic and stockpiling of materials.

The utilisation of the already disturbed areas to the north of Kap Shui Mun Bridge will not require additional earthworks to the surrounding Lantau hillsides and so will not cause landscape impacts. However, it will be a source of visual impact due to the presence of the construction works and stockpiling of material. It is in a prominent location and clearly visible from the Lantau Link, Kap Shui Mun Channel, Ma Wan and the Tsing Lung Tau to Sham Tseng coastal areas. VSRs at these locations will all suffer significant visual impacts during the construction period.

Approximate areas of vegetation and natural features disturbed are given in *Table 11.1*.

Operational Impacts

The Route 10 (NLYLH) alignment will have a significant adverse and irreversible impact on the landscape. There would be significant impacts during construction when the changes caused by earthworks would be highly visible.

The extent of earthworks and reclamation required for the toll plaza causeway adjacent to Fa Peng and Tso Wan will cause major adverse impacts to the existing landscape character of this open bay and coastal area. However, the impact is curtailed to a degree, by the retention of small bays and coastline creating lagoons adjacent to the village areas (although this would not be feasible under NSLDFS). During construction, the reclamation works will be clearly visible and have little opportunity to be screened. The reclamation for the toll plaza will be highly visible to the residents of the villages of Fa Peng and Tso Wan who are not directly affected by construction and will not be resumed. The recommendation of noise barriers will cause further intrusion to their views.

The earthworks to the north of the toll plaza would have a significant adverse and irreversible impact on the promontory at Sam Chuen. The section of viaduct over the Yi Chuen promontory will be a visually prominent structure along the coastline. The works will be highly visible from viewpoints to the east such as the new residential and recreational developments on Ma Wan island, together with the boat traffic in the

Ma Wan Channel.

Ng Kwu Leng would be severely and irreversibly affected by the extensive earthworks resulting in the cutting along its ridgeline and additionally, by the cutting required for the Tsing Lung Bridge landfall, cable back stays and ancillary areas. This will significantly impact on the visual amenity of the headland.

Visually, the Route 10 (NLYLH) alignment will introduce a major elevated man-made structure from Fa Peng and Tso Wan across the natural coastline towards the Ng Kwu Leng peak. This elevated road will be a prominent feature in contrast to the natural hillside and coastline, while the major cutting through the Ng Kwu Leng will dramatically and irreversibly change its visual character.

Approximate areas of loss of vegetation and natural features in the North Lantau Section are given in *Table 11.1*.

11.9 Tsing Lung Bridge Section

This section mainly comprises the bridge over the Ma Wan Channel, the LCUs are confined to the landfalls at each end. At the southern end are the natural slopes of the tip of Ng Kwu Leng. On the opposite side of Channel are the lower coastal slopes below Tai Lam Country Park. These have been disturbed by quarry workings and the earthworks and construction associated Tuen Mun Road and Castle Peak Road.

The northern tip of Lantau Island, Kwai Shek, is a visually prominent and natural landscape feature with a high point further south at Ng Kwu Leng. The hillsides support a grass and scrub vegetation down to a steep rocky shoreline. The low level of human disturbance on this headland results in a high landscape quality. The shoreline between the KSM Bridge and Kwai Shek peninsula is visible from to the Ma Wan, the more distant residential developments along Castle Peak Road.

To the north of the Ma Wan Channel, the Tsing Lung Tau area is characterised by steep, partially disturbed slopes falling from the Tuen Mun Road down to Castle Peak Road and a rugged, vegetated shoreline. The ex-Tsing Lung Tau quarry sites which are located between Hong Kong Garden and Ka Lung Tsuen are zoned "Undetermined" ("U") on the approved Tsuen Wan West Outline Zoning Plan No. S/TWW/7. However, there is a proposal to rezone the smaller ex-quarry site, immediately adjacent to Hong Kong Garden, as "Residential (Group C)"("R(C)") for low-rise development. The slopes are vegetated with a mixture of natural and planted woodland. A number of small beaches are also present. Above these slopes are the Tuen Mun Road corridor and the steep naturally vegetated slopes of the Tai Lam Country Park.

Additional Construction Impacts

An extensive contractor compound is proposed to the west of the Tsing Lung Tau Bridge landfall. It is located primarily on the already disturbed areas of land adjacent to Tuen Mun Road and will not cause extensive additional landscape impacts. However, a number of smaller areas, comprising natural slopes and vegetation will be lost. A smaller compound is proposed on the possible R(B) site in the small quarry to the east of the bridge. Again, this utilises an already disturbed area of land and will

not result in major landscape impacts.

The compound will, in general, be screened from the adjacent VSRs in Hong Kong Garden and the Castle Peak Road areas due to the retention of the intermediate hill. Users of Tuen Mun Road will suffer a low level of visual impact, although the dense roadside tree planting will be retained obscuring much of the construction works and stockpiling. The smaller compound to the east will, however, be a major element in views from Hong Kong Garden and Castle Peak Road and will cause significant visual impacts.

Operational Impacts

As indicated above the Route 10 (NLYLH) main alignment will cut through Ng Kwu Leng, the highest point on the peninsula. This will result in significant adverse and irreversible impacts to the landform of North Lantau. The Tsing Lung Bridge southern landfall will cause the same significant impacts to the natural hillside and coastline at Kwai Shek.

The northern landfall of the bridge is onto the site of a former quarry and so will not cause major landscape impacts. However, a number of new large slopes are required adjacent to the tunnel portal below Tuen Mun Road. These will cause irreversible landscape impacts to natural landform and the vegetation of the adjacent hillside around the quarry. The tunnel portal itself, together with the administration building will be constructed on the already heavily disturbed areas of the quarry and will result in limited landscape impacts, although the existing rough vegetation comprising grass, scrub and young trees will be disturbed.

The construction of any large bridge, particularly across an open channel will inevitably cause major visual changes to views that exploit the open coastal location. Such a major man-made feature can potentially be a visual highlight, e.g. Tsing Ma Bridge, rather than an eyesore. However, the VSRs in close proximity to the bridge, such as Hong Kong Garden and the possible R(B) site, will suffer significant visual impacts due to the scale of the bridge structures, e.g. the columns and towers in close proximity. These will be dominant features screening their views. To avoid excessive impact to Hong Kong Garden VSRs the ridgeline to the east of the quarry should be maintained.

A number of local beaches will also suffer adverse and irreversible impacts due to the introduction of the bridge as a dominant man-made structure. Beaches near to the bridge will be particularly affected by the towers.

To minimise impacts, not only is the bridge design critical but also the design of the ancillary facilities and structures at the landfall. The northern end of the bridge enters a tunnel and so could be a potential source of both visual and landscape impact. This should be carefully considered as the design progresses, particularly in the context of the proximity of Hong Kong Gardens, in order to maintain the same ridge at the top of the quarry facilities should be concentrated within the already disturbed quarry area. This will avoid excessive impact to Hong Kong Garden VSRs due to loss of the hill ridgeline.

11.10 Tsing Lung Tau to Siu Lam Section

This section of the study area primarily comprises the Tai Lam Country Park and an undisturbed ridge to the west. Between these two areas is the Tai Lam Chung Valley which has been subject to low-rise development and is the site of a former quarry.

Much of the eastern part of the study area is defined by the naturally vegetated, undulating hillsides of Tai Lam Country Park and the dam of the Tai Lam Chung Reservoir. This is an area of little human disturbance and high landscape quality. To the west, the hills form the backdrop to the Tai Lam Chung valley. This is a narrow valley defined by steep slopes, with natural woodland on the east and grassland on the west. The upper section, adjacent to the Tai Lam Chung Reservoir dam, is developed as a Correctional Institution facility. Further south, the eastern valley side has been disturbed by a disused quarry.

The modern village of Tai Lam Chung Tsuen is orientated to the south, towards the sea. Houses on the western periphery of the village will be VSRs. A temple is present in the village. A watercourse in the base of the valley serves as an outflow for the reservoir and is trained for most of its length within a rockfill bed. The valley bottom is lined by development including low-rise houses, open storage and unused development areas.

The valley landscape is heavily disturbed and is of low landscape quality. To the east of the valley is a relatively undisturbed ridge separating Tai Lam Chung valley from the neighbouring Siu Lam valley. The sides of this ridge are steep and vegetated primarily by rough grass and scrub and, unlike many of the hills in the area, has not been eroded. This ridge is of high landscape and visual quality.

The natural upland areas are prominent features within the local landscape and are features in the views from the local VSRs based in the valley.

Additional Construction Impacts

A large contractor compound is proposed in the slope surrounding the tunnel portal at Tai Lam Chung Valley. Formation of this compound will require extensive earthworks to create a flat platform onto the generally natural hillside. This will result in significant and irreversible landscape impacts to the landform and vegetation, even though part of the compound utilises the existing quarry site.

Visually, this compound will be a major element in views within the valley, particularly from the Tai Lam Chung Tsuen village. VSRs will suffer significant adverse visual impacts due to the extent of earthworks and consequent exposure of rock and soil, loss of woodland vegetation, construction works and stockpiling.

Operational Impacts

As Route 10 (NLYLH) will be enclosed within tunnel sections up to the eastern slope of the Tai Lam Chung valley, there will be no landscape or visual impacts affecting the Tai Lam Country Park.

The main landscape impacts will arise from the disturbance to the local topography and vegetation caused by the construction of the tunnel portal on the eastern side of the valley and the extent of earthworks for the cutting through the Siu Lam ridge. The earthworks for the tunnel portal will cause significant and irreversible impacts to the natural terrain and vegetation of the upper eastern valley side. The viaduct, at approx. 49 to 56mPD across the valley will require cuttings up to 60m high on both sides of the road, bisecting the Siu Lam ridge. The level of disturbance to the valley will be dependent on the method of construction and support of the bridge or viaduct, that is, the number and type of supporting columns. The valley floor already contains low-rise developments and areas of open storage and will not suffer significant impacts.

The viaduct will be a major structure in the views across the valley, which to the more distant VSRs, in the Ma Wan Channel and beyond, appears relatively undisturbed. However, the distance and availability of alternative views does offset some of the impacts caused. Locally, VSRs within the valley benefit from the tree planting such as from Tuen Mun Road, the villages of Luen On San Tsuen, Wong Uk and Wu Uk, together with the Tai Lam Chung Sea Activities Centre. The village of Tai Lam Chung Tsuen, which is in close proximity to the viaduct, will not be greatly affected as the intermediate wooded knoll north of the village which, together with the houses' orientation to the south west, screens some of the impacts.

The elevation of the road will cause extensive earthworks across the Siu Lam ridge bisecting it with cut slope up to 60m high. This will be a major detrimental element in the area. Only views directly from the south will be less affected as the ridge will be retained from this direction.

Approximate areas of landscape features disturbed are given in *Table 11.1*

11.11 Siu Lam to So Kwun Wat Section

Existing Landscape and Visual Context

This part of the study area primarily comprises the So Kwun Wat valley and a large knoll separating it from the Siu Lam valley.

The Siu Lam valley is narrow and bounded by steep slopes vegetated with a mix of grass and scrub on the upland areas and woodland in the more sheltered watercourses. There are villages and agricultural land in the upper sections towards the reservoir. The lower parts of the valley are heavily disturbed with the ongoing high-rise residential development adjacent to Tuen Mun Road.

Sections of this knoll are naturally vegetated with grass and scrub on the more exposed areas and dense tree and scrub in the river courses. However, large areas are heavily disturbed by the formation of earthworks platforms and some development.

So Kwun Wat valley is much larger than Siu Lam and has a broad flat floor. The valley sides are steep and vegetated with a variety of grass and scrub, with dense woodland in the lower parts and along the sheltered watercourses. The valley has distinctly contrasting landscape and visual characters at its western and eastern ends. To the west, adjacent to the Tuen Mun Road, it is heavily disturbed by open stacked container storage, derelict development areas and the modern village housing in So

Kwun Wat Tsuen, which is currently expanding. This part of the So Kwun Wat valley has low landscape quality.

East of this, however, is a relatively undeveloped area of agricultural land, although much lies fallow, and a small satellite settlement off the main So Kwun Wat Tsuen. A number of grave sites are present in the lower hillsides. The low level of disturbance within this part of the valley results in a high landscape quality. Further east, at Pak Shek Hang, the valley branches into two. Both arms are primarily undisturbed, except for the hillside catchwater, and end at the reservoir. The long distance MacLehose Trail runs along the catchwater.

The northern valley side comprises natural hillsides and vegetation, the upper levels of which form part of the Tai Lam Country Park. These undisturbed hillsides have a high landscape and visual quality.

The mixed land usage and levels of disturbance to the So Kwun Wat and Siu Lam valleys, and the knoll result in a mix of landscape and visual characters. VSRs are concentrated within the valleys, particularly to the west of the site. Many lower level views from adjacent areas are screened from the site by intermediate landform and vegetation. There are distant views up the valley from the Gold Coast development.

Additional Construction Impacts

A large contractor's compound is proposed on the ridge between the Siu Lam and So Kwun Wat Valleys. The compound is located in an area which is already severely disturbed and will not cause any additional landscape impacts to the surrounding hillsides.

The ridge is not readily visible from many VSRs. Only the residents of the high-rise residential areas of the Siu Lam Valley will be affected. The views towards the compound from these apartments will be from an acute angle and will not be the main part of their views. Only low visual impacts are anticipated due to the compound.

A smaller contractor's compound is proposed to the east of Tuen Mun Road at the southern end of the Tai Lam Chung Valley. This is located adjacent to several godowns on an existing disturbed area and will not cause any landscape impacts.

The compound will be within an area of existing low visual quality adjacent to the godowns and between Castle Peak and Tuen Mun Roads. As such it will not cause major visual impacts to the existing visual environment but, nonetheless, there will be minor impacts due to the construction works, traffic and stockpiling.

Approximate areas of disturbed natural landscape features have been identified in *Table 11.1*.

Operational Impacts

The viaduct across the Siu Lam valley will be at +57 to +66mPD. The level of impact to the valley will be partially dependent on the type of construction and number of viaduct columns required. It will be constructed over the rural village, woodland and agricultural land at the northern end of the valley. The structure will be a major

transport element within this valley characterised by the low key rural development, reducing its visual quality. The construction of the columns will cause local impacts within the Siu Lam village, as they will affect the trees and, potentially, the buildings. It will be a prominent transport element in the views from both the village and the new high-rise residential development at the southern end of the valley.

The alignment will pass across the knoll at +66mPD and will primarily be at grade so causing only moderate impacts to the already disturbed hill. The Siu Lam Link Road will cause additional effects, between the knoll and Tuen Mun Road, on the hillsides to the north of the Siu Lam Valley. However, many parts of these hillsides are already disturbed reducing the level of impact. There will be considerable visual impacts, as the Link Road will require sections of viaduct, with noise barriers, for its connection to Tuen Mun Road.

As the road approaches the So Kwun Wat valley, the hillsides are primarily natural and undisturbed resulting in significant and irreversible impacts along its side. The alignment will have a highly significant adverse impact on the residents of So Kwun Wat Tsuen. It will also cause significant and irreversible impacts on the high quality landscape of the eastern section of the So Kwun Wat valley with the extensive network of viaducts and the resultant earthworks and columns. In both options the northern tunnel portal is just below the catchwater which defines the Country Park boundary and will be highly visible from the Country Park and the MacLehose trail.

The So Kwun Wat Link Road to Tuen Mun Road will cause significant impact to the eastern parts of the valley primarily to the natural slopes on the northern valley side. It will cause a major change in character to the existing landscape and visual context of the valley side, particularly considering its elevation. VSRs both within the valley, village of So Kwun Wat Tsuen and the other settlements, together with the high-rise residents of the Gold Coast, will all suffer visual impacts, to differing degrees, due to the scale and dominance of the new road and the requirement for noise barriers along much of its length.

Table 11.1 Landscape Analysis and Impact Assessment

Key : Cons: Construction Stage
Oper: Operation Stage

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
North Lantau Section (refer to Figures 11.2 and 11.7)					
LCU 1	*Village Areas* To the south are the valleys of Fa Peng and Tso Wan which contain clusters of isolated rural village settlement within a mixed woodland. Local walking trails over the hillsides connect these villages to Penny's Bay and North Lantau. The villages, in their wooded inlet setting, are a scenic visual feature along the North Lantau coast.	High	*Toll Plaza Reclamation* The reclamation required for the toll plaza adjacent to Fa Peng and Tso Wan is likely to cause major adverse impacts to the existing landscape character of the villages as they will lose their relatively undisturbed coastal context. The open bay will also be lost and replaced by a large piece of infrastructure. The toll plaza will become a dominating element of their local landscape.	Significant adverse	Significant adverse
LCU 2	*Transport Corridor* The landfall of the Kap Shui Mun Bridge, and North Lantau Highway, is a major area of recent disturbance, with reclamation, major slope cuttings and man-made structures. It is an area of very low landscape quality. The scale of disturbance and manmade elements associated with the road result in this being a visual element of very low quality.	Low	*North Lantau Highway and KSM Bridge* Route 10 will cross the North Lantau Highway below the KSM Bridge. As this is already an area of large scale disturbance, the impact will be low.	Slight adverse	Slight adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 3	*North Lantau Natural Hillside and Coastline* This LCU comprises two hills separated by a valley containing the North Lantau Highway. Both the eastern slope of Fa Peng Leng and the Ng Kwu Leng hill have natural landforms which are steeply sloping with narrow stream and river valleys leading to small natural inlets. The hillside vegetation is characterised by natural grass and low scrub with trees growing in the sheltered valleys. The shoreline comprises steep exposed rock outcrops between the vegetated hillside and the water. There is a very low level of disturbance within this area. The expanse of undisturbed natural hillside and coastline result in the North Lantau hillsides of Fa Peng Teng and Ng Kwu Leng being visual elements of high quality.	High	*Disturbance to Natural Coast* The earthworks to the north of the toll plaza will have a significant and irreversible impact on the natural promontory at Sam Chuen and will be a major element reducing the visual quality of the area. The large scale of earthworks required across Ng Kwu Leng will also cause irreversible impacts to this natural headland. The overall effect will be the creation of a new landscape character to the headland. Permanent disturbance will occur to 200m of natural coastline, 0.8 Ha of secondary woodland, 8 Ha of shrubland / tall shrubland and 9 Ha of grassland / shrubland. Approximately 18 Ha of natural hillside will be disturbed the major ridgeline of Ng Kwu Leng. Temporary disturbance will also suffered by 0.5 Ha of shrubland / tall shrubland and 4.4 Ha of grassland / shrubland.	*Significant adverse*	Significant adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
Tsing Lung Bridge Section (refers to Figure 11.3, 11.7 and 11.8)					
LCU 3	*North Lantau Natural Hillside and Coastline* The northern tip of Lantau Island, Kwai Shek, is a visually prominent and natural landscape feature with its high point further south at Ng Kwu Leng. The hillsides support a grass and scrub vegetation down to a steep rocky shoreline. The low level of human disturbance on this Lantau headland results in a high landscape quality. The natural shoreline north of the KSM Bridge and the Kwai Shek peninsula are prominent landscape features highly visible from the north.	High	*Tsing Lung Bridge Southern Landfall* The southern landfall of the bridge will require extensive earthworks adjacent to the coastline on the natural hillside. This will cause irreversible impacts to the landform and vegetation.	Significant adverse	Significant adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 4	*Disturbed Hillside* To the north of the Ma Wan Channel, the Tsing Lung Tau area is characterised by steep slopes falling from the Tuen Mun Road down to Castle Peak Road and a rugged, vegetated shoreline. An abandoned quarry lies to the west of the high-rise residential development of Hong Kong Garden and the low-rise developments at Ka Loon Tsuen. The slopes are vegetated with a mixture of natural and planted woodland. A number of small sand beaches are also present. The quarry floor and adjacent disturbed areas are re-colonising with trees and scrub. These south facing slopes provide a vegetated backdrop to the coast and are a prominent feature in views from Hong Kong Garden.	Medium	*Tsing Lung Bridge Landfall and Tunnel Portal* The northern landfall of the bridge is onto a former quarry floor and so most impacts will be confined to the quarry floor. However, this will require the removal of the recolonising vegetation. Additionally, extensive earthworks to the surrounding hill top are required for the tunnel portal. This will cause irreversible impacts to the natural slopes and vegetation of the hillside that surrounds the quarry, severely. reducing the visual quality of the hillside from Hong Kong Garden. Additionally, 2.6 Ha of reclamation will be required for the bridge tower. The existing quarry access road down to Castle Peak Road will be used as a haul road resulting in additional impacts to the vegetation. Two temporary contractor's compounds will also be used adjacent to Castle Peak Road, however, they will be on existing derelict land and cause no landscape impacts	Significant adverse	Significant adverse
			Permanent disturbance will occur to approximately 160m of natural coastline. Small areas of grassland and shrubland, as well as minor stream course may be affected, together with the low ridge across the top of the quarry		

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 5	*Transport Corridor* Above the coastal slopes of Tsing Lung Tau is Tuen Mun Road which is a major strip of disturbance with a dual carriageway road and extensive cut slopes.	Low	*Tunnel Section* Route 10 will be enclosed within a tunnel prior to crossing this transport corridor. This will result in no impacts.	No impact	No impact
LCU 6	*Natural Hillsides (including Tai Lam Country Park)* Above Tuen Mun Road are the steep natural slopes of Tai Lam Country Park. At the lower levels these slopes are naturally vegetated with woodland. The higher levels are dominated by grass and scrub. The minimal disturbance results in a high landscape quality. The vegetated natural slopes provide a backdrop above Tuen Mun Road and are a high quality visual feature.	High	*Tunnel Section* Route 10 will be enclosed within a bored tunnel through the Tai Lam Country Park. This will avoid any impact to this LCU.	No impact	No impact

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
Tsing Lung Tau to Siu Lam Section (refer to Figures 11.4 and 11.8)					
LCU 6	*Natural Hillside (including Tai Lam Country Park)* Much of the eastern part of the study area is defined by the naturally vegetated, undulating hillsides of Tai Lam Country Park and the dam of the Tai Lam Chung Reservoir. To the west, the hills form the backdrop to the Tai Lam Chung valley. This is an area of little human disturbance and high landscape quality. The natural hillsides of the Country Park are a major visual feature of the area and are of a high visual amenity	High	Tunnel Section and Portal The Tai Lam Country Park will not suffer impact as Route 10 will be enclosed within a tunnel until well beyond the Park Boundary. However, beyond the Country Park Boundary, the tunnel portal and viaduct landfall will cause significant and irreversible impacts to the natural vegetation and landform, above the quarry rockface, of the hillside above the Tai Lam Chung Valley. This will be severely detrimental to the natural part of the hillside also reducing is visual amenity. A haul road will also be constructed from the existing road to the south. This will result in additional impacts to the topography and vegetation. Permanent disturbance will occur to approximately 1.8 Ha shrubland / tall shrubland, approx 420m of minor streamcourses, and disturbance to the ridgeline on top of the rockface. Additionally, there will be approximately 1.2 Ha of shrubland / tall shrubland disturbed temporarily.	Significant adverse	Significant adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 7	*Tai Lam Chung Valley* This is a narrow valley defined by steep slopes, with natural woodland on the east and grassland on the west. The upper section, adjacent to the Tai Lam Chung Reservoir dam, is developed as a Correctional Institution facility. To the south, the eastern valley-side has been disturbed by a disused quarry. The modern village of Tai Lam Chung Tsuen is orientated to the south, towards the sea. A temple is present in the village. A watercourse in the base of the valley serves as an outflow for the reservoir and is trained for most of its length within a rockfill bed. The valley bottom is lined by development including low-rise houses, open storage and unused development areas. The valley landscape is heavily disturbed and is of low landscape quality. The extent of disturbance reduces the visual amenity of the valley, however, the low height of the development, together with the presence of the river improve its quality.	Medium	*Tai Lam Chung Viaduct* The degree of impact will be dependent on the method of construction, together with the number and type of columns, required to extend the viaduct across the valley. The columns will cause direct impacts on the valley floor with the potential disturbance to vegetation. However, the valley floor is already disturbed resulting in a lesser impact.	*Moderate adverse*	Moderate adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 8	*Siu Lam Ridge* To the east of the valley is a relatively undisturbed ridge separating Tai Lam Chung valley from the neighbouring Siu Lam valley. The sides of this ridge are steep and vegetated primarily by rough grass and scrub and, unlike many of the hills in the area, has not been eroded. This ridge landscape has high landscape quality. The low level of disturbance to the knoll results in it having a high visual amenity.	High	*Earthworks across the ridge* Route 10 will bisect the Siu Lam Knoll perpendicular to the natural ridgeline. This will cause significant and irreversible impacts to the natural landform and vegetation of the knoll and reduce its visual quality. The required earthworks will result in 60m high cut slopes on both sides of the road, the engineered character of which will contrast sharply with the remaining hillside. Permanent disturbance will be suffered by approximately 6 Ha of grassland / shrubland and 1.8 Ha of shrubland / tall shrubland, together with the loss of the major Siu Lam ridgeline / knoll	Significant adverse	Significant adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
Siu Lam to So Kwun Wat Section (refer to Figures 11.5, 11.6, 11.8 and 11.9)					
LCU 9	*Siu Lam Valley* The Siu Lam valley is narrow and bounded by steep slopes vegetated with a mix of grass and scrub on the upland areas and woodland in the more sheltered watercourses. There are villages and agricultural land in the upper sections towards the reservoir. The lower parts of the valley are heavily disturbed with the ongoing high-rise residential development adjacent to Tuen Mun Road. The woodland valley setting for this village results in it having a high visual amenity.	High	*Siu Lam Viaduct* The level of impact will be partially dependent on the type of construction and number of columns required. However, the viaduct will be constructed over the rural village, woodland and agricultural land at the northern end of the valley. This will cause major landscape impacts at the ground level due to the construction of the columns, and potential loss of woodland, which may be of local Fung Shui importance. The structure will be a major landscape element within this valley characterised by the low key rural development, also reducing its visual quality.	Significant adverse	Significant adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 10	*Disturbed Ridge* A large ridge separates the Siu Lam and So Kwun Wat Valleys. At the lower levels the knoll has natural slope and is vegetated with dense scrub. However, the top of the knoll has been removed leaving a large open disturbed area. The level of disturbance to the peak of the ridge reduces its visual amenity, particularly when viewed from elevated viewpoints.	Low	*Road at grade and Siu Lam Link Road* The alignment, including the administration building, will primarily be at grade across the disturbed ridge between the Siu Lam and So Kwun Wat Valleys so causing only relatively minor landscape impacts. However, the Siu Lam link road towards Tuen Mun Road will cause severe and irreversible impacts to the hillsides west of the Siu Lam Valley and to the landform and vegetation to the west of Tuen Mun Road. The impacts are reduced due to the amount of disturbance already present in the area. Approximately 3.6 Ha of tall shrubland and a number of minor streamcourses will be disturbed.	Moderate adverse	Moderate adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 11	*Eastern So Kwun Wat Valley* So Kwun Wat valley is much larger than Siu Lam and has a broad flat floor. The valley sides are steep sided and variously vegetated with grass and scrub, together with dense woodland in the lower parts and along the sheltered water courses. It is a relatively undeveloped area of agricultural land, although much lies fallow. There is a small satellite settlement of So Kwun Wat Tsuen. A number of grave sites are present in the lower hillsides. Further east, at Pak Shek Hang, the valley branches into two. Both arms are primarily undisturbed, except for the hillside catchwater, and end at the reservoir. The low level of disturbance within this part of the valley results in a high landscape quality. The valley, with its farmed floor and natural sides, is a high quality visual feature	High	*Disturbance to natural valley side* A series of viaducts are proposed between the disturbed ridge to Siu Lam and the tunnel portal below the Tai Lam Country Park. These will cause significant impacts to the valley floor due to the large area of construction and number of columns. Sections of road across the local ridgelines and along the valley side will require extensive earthworks causing significant and irreversible impacts to the local vegetation and terrain. The road will form a new character within this area from the relatively undisturbed valley to a major transport corridor. Approximately 0.2 Ha *Fung-shui* woodland and 4.5 Ha shrubland / tall shrubland will be lost, together with disturbance to minor streamcourse.	Significant adverse	Significant adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 12	*Western So Kwun Wat Valley* The section of So Kwun Wat Valley adjacent to the Tuen Mun Road contrasts sharply with the eastern part. It is heavily disturbed with open stacked container storage, derelict development areas and the modern village housing in So Kwun Wat Tsuen, which is currently expanding. This results in this part of the So Kwun Wat valley having low landscape quality. The high level of disturbance together with the freight storage use of land result in a poor visual quality of this part of the valley. The So Kwun Wat OZP indicates the western part of the valley for planned developments including G/IC, CDA and high rise residential development. At this stage there is insufficient information concerning committed developments to give a detailed assessment, however, it is assumed that it will be equivalent to similar developments in Hong Kong and of a medium to low landscape quality and visual amenity.	Low	*Valley floor unaffected* The alignment of the road generally runs along the natural valley side (refer to LCU 11) rather than the floor and will not greatly affect the already disturbed areas of the valley.	Slight adverse	Slight adverse

Landscape Character Unit LCU	Description	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
				Cons	Oper
LCU 13	*Natural Hillside (including Tai Lam Country Park)* To the north of the study area is a major ridgeline within the Tai Lam Country Park and is characterised by the naturally vegetated, undulating hillsides of Tai Lam Country Park and the dam of the Tai Lam Chung Reservoir. To the west, the hills form the backdrop to the Tai Lam Chung valley. The MacLehose Trail runs next to a catchwater along the boundary of the Park. This is an area of little human disturbance and high landscape quality. The undisturbed nature of the Country Park is a major visual feature and of high visual amenity.	High	*Tunnel Section and So Kwun Wat Link Road* Route 10 will be enclosed within a bored tunnel through the Tai Lam Country Park avoiding any impact to the Park. However, the So Kwun Wat Link Road runs along the relatively undisturbed northern valley side and will cause significant and irreversible impacts to the natural landform and vegetation particularly due to the West So Kwun Wat Interchange. Small valleys along the northern side of So Kwun Wat will also be affected due to the extent of earthworks, loss of natural landform and disturbance to natural vegetation, losing their relatively undisturbed rural character. Approximately 2 Ha of shrubland / tall shrubland will be affected.	Significant adverse	Significant adverse

Table 11.2 Analysis of Visually Sensitive Receivers and Impact Assessment

Several areas within the Study Area are indicated on the So Kwun Wat OZP for planned development, particularly in the So Kwun Wat and Siu Lam Valleys. At this stage there is only limited information available in these areas. These planned developments have been included within the assessment where possible, however, the assessment can only be expressed in broad and general terms. Noise barriers are an additional source of impact and their presence will exacerbate an impact rather than be the sole source of impact. (Refer to *Figures 11.10* and *11.23*)

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
North Lantau Section						
Local Villages	1 Fa Peng 2 Tso Wan	Views are eastwards are over the natural inlet and towards the open channel to Tsing Yi. The views are primarily undisturbed in character.	High	Existing open views will be blocked by the toll plaza and reclamation, which will be a dominating element in views east. The series of vertical noise barriers, at 3m, 5m, 6m and 8m high, together with the cantilever barriers at 8m high, will be additional visual intrusion. However, they will also partially screen the potentially slow moving traffic and kiosks at the toll plaza. The openness of views across to the toll plaza will also result in additional impacts at night-time due to glare from the highway lighting.	Significant adverse	Significant adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
East Lantau Planned Reclamation	3 Potential Tourist and Recreational Facilities (currently zoned Undetermined)	The projected baseline visual context for the facilities will be east towards the villages of Fa Peng and Tso Wan with the natural terrain and vegetation of the Fa Peng Teng hillsides in the background. These parts of the views are of high quality, and will potentially be viewed by tourists and recreational users resulting in a high sensitivity.	High	The alignment and toll plaza will be major elements screening the lower level views towards the village, resulting in a loss of views towards the good visual quality of the rural setting. The series of vertical noise barriers, at 3m, 5m, 6m and 8m high, together with the cantilever barriers at 8m high, will be additional visual intrusion.	Significant adverse	Significant adverse
Ma Wan Channel Figure 11.13	4 Boat Traffic	Views towards the site are of the natural hillside, vegetation and coastline of Ng Kwu Leng. This is one of the few remaining areas of natural coastline on the northern side of Lantau and provides visual relief from the disturbance caused by the Highway and Kap Shui Mun Bridge.	High	The views will change dramatically from its existing character of the natural headland comprising a single hill. The road will require extensive earthworks bisecting the headland and causing high cut slopes. The road and bridge will become the dominating elements of the headland. Highway lighting will also cause additional impacts at night-time, although the number of VSRs is generally lower. The series of vertical noise barriers, at 3m, 5m, 6m and 8m high, together with the cantilever barriers at 8m high, will be additional visual intrusion.	Significant adverse	Significant adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Kap Shui Mun Channel Figure 11.13	5 Boat Traffic	Views towards the site are of the natural hillside, vegetation and coastline of Ng Kwu Leng, Yi Chuen and Sam Chuen, together with the bay and wooded rural villages of Tso Wan and Fa Peng. This is one of the few remaining areas of natural coastline on the northern side of Lantau and provides visual relief from the disturbance caused by the Highway and Kap Shui Mun Bridge.	High	The views will become dominated by the elevated road across the Yi Chuen and Sam Chuen headland, together with the toll plaza reclamation across the Fa Peng and Tso Wan villages. Night-time highway lighting will cause additional impact. The visual character of this area coast will experience extreme changes resulting in major impacts. The series of vertical noise barriers, at 3m, 5m, 6m and 8m high, together with the cantilever barriers at 8m high, will be additional visual intrusion.	Significant adverse	Significant adverse
Ma Wan Figure 11.14	6 Proposed Theme Park 7 Village Resite 8 Proposed High-rise Residential Development	Views towards the site are of the natural hillside and coastline of Yi Chuen, Sam Chuen and Ng Kwu Leng, but also are dominated by the disturbed areas of the KSM Bridge and North Lantau Highway reducing their sensitivity.	High	The road will be a prominent element of the North Lantau coastline and will severely detract from the existing views. Together, with the KSM Bridge and North Lantau Highway, and the lighting, the views will be dominated by infrastructure. The series of vertical noise barriers, at 3m, 5m, 6m and 8m high, together with the cantilever barriers at 8m high, will be additional visual intrusion.	Significant adverse	Significant adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Lantau Link and North Lantau Highway Figure 11.15	9 Commuters / vehicular passengers	Views towards the site vary but are generally of the natural hillsides and coastline of the Sam Chuen, Yi Chuen, Ng Kwu Leng and Kwai Shek headland. Their elevated position, relative to the site, together with their speed and transitory nature greatly reduce their sensitivity. However, this route is an entrance to Hong Kong from the international airport and results in an overall sensitivity which is high.	High	The views from the Lantau Link will be only be affected in one direction, i.e. southbound towards the airport. The VSRs are elevated above the new roads, which will lessen the impacts. However, the local Lantau coastline and headlands will be severely affected. The speed and transitory nature of the VSRs will reduce the impact.	Moderate adverse	Moderate adverse
Sham Tseng to Hong Kong Garden Figure 11.15	10 Hong Kong Garden 11 Possible R(B) zone to the west of Hong Kong Garden	The high-rise residential development at Hong Kong Garden and possible low-rise development at the R(B) have views directly across the channel towards natural hillsides and coastline of Ng Kwu Leng and Ma Wan. Although the KSM Bridge is prominent in the views it does not detract from them as it is a positive visual element. The disturbed areas of reclamation and road are screened resulting in a high visual quality.	High	The extent of earthworks and the disturbance to the natural Ng Kwu Leng headland will detract severely from the views increasing the level of disturbance experienced. The single knoll of the headland will be replaced, in the long term, by a bisected knoll with steep engineered slopes, losing much of its existing visual quality and thus causing a severe irreversible impact to views from Hong Kong Gardens and the R(B) site.	Significant adverse	Significant adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Tsing Lung Tau to Sham Tseng Figure 11.16	12 Sham Tseng	Views from Sham Tseng are partially screened by Ma Wan and the new high-rise developments occurring there. Although their views are of the undisturbed Ng Kwu Leng, their distance from site, together with the amount of visual disturbance caused by the Ma Wan developments reduce the visual quality.	Medium	The extent of earthworks and the disturbance to the natural headland will cause severe impacts to the existing views from the Sham Tseng residential developments. However, the distance of the VSRs, together with the orientation of the buildings to the south reduce the visual impact.	Moderate adverse	Moderate adverse
Tsing Yi	13 West Tsing Yi Industrial Areas	Views towards the southern end of the site are possible from Tsing Yi, however, in the context that these are from heavy industry sites, e.g. an oil depot, the visual sensitivity is low.	Low	The toll plaza adjacent to Fa Peng and Tso Wan will be in views from the western areas of Tsing Yi. However the distance of the VSRs and their industrial nature greatly reduce the impacts.	Slight adverse	Slight adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Tsing Lung Bridge Section						
Ma Wan Figure 11.14	14 Proposed Theme Park 15 Village Resite 16 Proposed High-rise Residential Development	Views to the southern end of the site from Ma Wan are across Kap Shui Mun to the natural peak of Ng Kwu Leng. To the north are distant views to the disturbed, but vegetated, coastal slopes below the undisturbed slopes of the Country Park.	High	The bridge will be a major element across the channel modifying the existing character of the open views. However, the Tsing Ma Bridge has shown that such structures should be considered as positive visual elements to the benefit of Hong Kong. Therefore, the bridge is not considered as an adverse impact, as it has an aesthetic design in context with the other local bridges, and will be a local landmark modifying the existing visual context. Highway lighting will be an impact, however, feature lighting for the bridge may be considered as also a positive element. During construction elements such as plant and the enclosed conveyor belt from the tunnel portal to the barging point will be additional impacts	Significant adverse	Change in character with bridge as visual feature

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Lantau Link and North Lantau Highway Figure 1.15	17 Commuters / vehicular passengers 17a Eastbound commuters / vehicular passengers	Views from the Lantau Link on both the eastbound and westbound carriageways are similar. They are towards the site and vary but are generally across the Ma Wan Channel to the partially disturbed and developed coastal areas below Tuen Mun Road with the natural hillsides of Tai Lam Country Park in the background. This sensitivity is increased due to the large number of tourists and HK visitors.	High	Views from the Lantau Link will experience a change in their views with the introduction of the bridge as a feature and should be regarded as a local landmark on and from the route to the airport.	Significant adverse	Change in character with bridge as visual feature
	18 Castle Peak Road	Typical views from the road are partially screened by local vegetation and buildings. However, where open views are possible, they are over the Ma Wan Channel towards the relatively undisturbed coastline and hillsides of north Lantau. However, the speed of VSRs, together with the transitory nature and the partial screening reduce their sensitivity.	Low	Their views will be variously affected by the introduction of the bridge. From the more distant part of the road the bridge will be a feature across the channel. However, in close proximity the scale of the towers, together with the views of the bridge deck overhead will be detrimental features. Overall, the low sensitivity will result in low impacts. During construction elements such as plant and the enclosed conveyor belt from the tunnel portal to the barging point will be additional impacts particularly as it goes directly over the road.	Slight adverse	Slight adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
East Ma Wan Channel Figure 11.15	19 Hong Kong Garden 20 Possible R(C) zone west of Hong Kong Garden 21 Yuen Tun Village 23 Local beaches 24 Sham Tseng	Typical views are over the Ma Wan Channel to the undisturbed peak of Ng Kwu Leng and the developments on Ma Wan. The North Lantau Highway is a prominent element in the views. Alternative views are west along the Channel towards the open sea. Despite the amount of manmade elements within these views, they are of high quality due to their openness.	High	Although the bridge is considered a positive visual feature in certain views, the large scale of the structure will cause detrimental impacts to the VSRs in close proximity to it. All of these VSRs, i.e. Hong Kong Garden, the local beaches, etc. will all suffer significant visual impact as they are not of sufficient distance away from the bridge to appreciate its form. Their views becoming dominated by the individual bridge structures, e.g. towers and footings, rather than being able to appreciate the bridge as a whole. Additionally, the VSRs may suffer night-time impacts due the increased levels of ambient light from the highway lighting. Sham Tseng residential developments and Yuen Tun village are located at a distance from the bridge allowing it to be a feature of their views. During construction elements such as plant and the enclosed conveyor belt from the tunnel portal to the barging point will be additional impacts	Significant adverse	Change in character of views with bridge as visual feature

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Tsuen Wan	25 Tsuen Wan	Distant views of the site are possible from the waterfront area and high-rise residential blocks in Tsuen Wan. The views are along the Ma Wan Channel which is framed by the developments on Ma Wan and the natural hillsides of Tai Lam.	High	The bridge will span the Ma Wan Channel in the distant views from Tsuen Wan. This should be considered as a major positive element which modifies the visual character rather than impacts on it. Feature night-time lighting of the bridge would also be a positive aspect.	Moderate adverse	Change in character of views with bridge as visual feature
Ma Wan Channel	26 Boat Traffic	Views from the Channel to the south comprise the natural hillside and coastline of Ng Kwu Leng, and also include the KSM Bridge. To the north they are of the disturbed, but vegetated, slopes below Tuen Mun Road and the natural hillside of Tai Lam Country Park.	High	The bridge will be a major feature across the channel modifying the existing character of the open views. Although the views from boat traffic in close proximity to the bridge may suffer impact due to the being dominated by the towers, etc. In general, the bridge will be a positive feature of the views During construction elements such as plant and the enclosed conveyor belt from the tunnel portal to the barging point will be additional impacts	Significant adverse	Change in character of views with bridge as visual feature

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
West Ma Wan Channel Figure 11.17	27 Ka Loon Tsuen 28 Gold Coast	Views are east along the Ma Wan Channel and also across it to North Lantau. Ka Loon Tsuen look directly south to the natural hillside of Ng Kwu Leng and includes the KSM Bridge. From high-rise residential areas of Gold Coast the views are open along the Channel towards Ng Kwu Leng. The northern end of this section is screened by the headland at Tai Lam Chung. Their distance from the site, together with having alternative views over the Channel reduces their sensitivity.	Medium	The bridge will be a major element of their views eastwards along the channel. For the VSRs in Ka Loon Tsuen the bridge will be a major element dominating views south and east. For Gold Coast the bridge will be a feature only in distant views. The location of Ka Loon Tsuen and Gold Coast allow both to have alternate views west over the open channel reducing impacts.	Moderate adverse for Ka Loon Tsuen	Change in character of views with bridge as visual feature

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Tsing Lung Tau to Siu Lam Section						
South Tai Lam Chung Valley Figures 11.18 and 11.19	29 Tai Lam Chung Tsuen	Views towards the site are partially screened by the local hillside and vegetation. They are of the disturbed valley in front of the backdrop of the natural Siu Lam knoll. However, the village is orientated to the south west (down the valley) with the views towards the site not being the primary ones, reducing their sensitivity.	High	The high level viaduct, 49 to 56mPD, over the hillside will be a major transport element within the valley, however, its is partially screened from the village by the local topography and hillside vegetation. The degree of earthworks and cutting through the Siu Lam knoll will cause major impacts. Additionally, they may suffer from an increase in the night-time ambient light levels due to the highway lighting. The proximity of structures to the village will exacerbate the impacts.	Significant adverse	Significant adverse
	30 Luen On San Tsuen 31 Wong Uk 32 Wu Uk 33 Tai Lam Chung Sea Activities Centre	Views towards the site are distant and partially screened at the lower levels by the local tree vegetation and topography reducing their sensitivity. They are of the disturbed areas of the valley floor and the local low-rise developments with the more natural valley side in the background.	Low	The high level viaduct will be a major visual element at the northern end of the valley. However, the screening afforded by the vegetation and topography local to the VSRs, together with their distance will reduce the impacts. Although, they may experience additional highway lighting at night-time they are already affected by Tuen Mun Road.	Slight adverse	Slight adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
	34 Tuen Mun Road	Views from Tuen Mun Road are possible from only a short section. The intermediate tree planting screens much of the developed floor resulting in the natural sides being the main feature. However, the speed of the VSRs reduces the sensitivity	Low	Although the high level viaduct, 49 to 56mPD, across the valley will be a major element the high speed of the VSRs, together with the viaduct being over 1 km away, local screening by roadside trees and the relatively short distance in which it is visible results in only minor impacts.	Slight adverse	Slight adverse
North Tai Lam Valley	35 Rural Houses 36 Correctional Institution	Views are south along the valley towards the Ma Wan Channel. Local tree planting screens views at the lower levels while the upper levels have views of the natural valley sides. The low number of residential VSRs, together with the nature of the Correctional Institute reduce the visual sensitivity.	Low	For VSRs in close proximity to the alignment the viaduct will be approx. 40-50m above the local ground level. This will result in the road structure being above the views and the main visual impacts arising from the columns at ground level. Local tree planting screens many views, which together with the low number of VSRs, reduces the visual impacts. They may also suffer from additional ambient light from the highway lighting.	Slight adverse	Slight adverse
Ma Wan Channel	37 Boat Traffic	Much of low rise development on the valley floor is screened by intermediate tree planting resulting in views being of the undisturbed valley sides.	High	The viaduct will be a major element across the natural appearance of the valley in the views from the Channel. However, the distance of the VSRs, together with their alternative views reduce the impact caused. Effects of the new highway lighting will be lessened by the existing lighting along Tuen Mun Road.	Moderate adverse	Moderate adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Siu Lam to So Kwun Wat						
Siu Lam Village Figure 11.20	38 Siu Lam Village	Views from within the Siu Lam village are generally screened by the local trees within the village itself. However, a number of open views are possible at certain locations. These comprise the natural landform and tree/scrub vegetation of the valley sides. The quality of these open views, together with the proximity of the site result in a high sensitivity.	High	Siu Lam is in close proximity to the alignment with the viaduct being approx. 30 to 40m above the local ground level. This will result in the road structure being above the views and the main visual impacts arising from the columns at ground level. Local tree planting screens many views, however the columns will be large scale dominating elements within the village. The VSRs may also suffer additional impacts due to an increase in the ambient light from the highway lighting high overhead and the 6m vertical noise barrier on the viaduct.	Significant adverse	Significant adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Siu Lam Development	39 High-rise residential development 40 CDA*	An extensive high-rise residential development is currently under construction to the east of Tuen Mun Road at the western end of the valley. Residents will have views eastwards along the valley towards the reservoir dam. The low level of disturbance, and the fact that there are a high number of residential receivers, within the valley results in views being of high sensitivity and quality. Angled views to the knoll between the Siu Lam and So Kwun Wat valleys will also be possible from the top storeys of the blocks. Despite their lack of quality, these are not the main views available and so do not reduce the overall visual sensitivity.	High	The open views along the primarily undisturbed valley will be severely affected by the viaduct 30 to 40m above ground level. The disturbance to views also caused by the link road and the cutting through the Siu Lam ridge will result in major impacts. The views south over the channel will also suffer severe intrusion, due to the Siu Lam Link Road viaduct connection with Tuen Mun Road. This intrusion will be heightened by the extent of noise barriers, 5m and 8m, along the viaduct. The viaduct and the 1.5m vertical noise barrier would be a prominent high level element of any new development within the CDA. Highway lighting may cause additional impacts due to increasing night-time ambient light levels and direct glare into apartments.	Significant adverse	Significant adverse

* No information or programme concerning committed developments in the Siu Lam CDA is available at this stage and a detailed assessment is not possible. This CDA is indicated on the So Kwun Wat OZP and has been included within this assessment to ensure comprehensive coverage of the VSRs within this vicinity should any development occur prior to Route 10.

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
		There are also open views possible to the south facing apartments over the channel. Despite the presence of Tuen Mun Road in front, the mid and upper level storeys have high quality views. The road bisects the CDA zone, which may in future comprise potentially highly sensitive receivers, such as residential, institutional, schools, and hospitals, occupies much of the Siu Lam valley floor				

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
So Kwun Wat Tsuen	41 So Kwun Wat Tsuen village (main village)	The majority of the houses within the village are orientated south-west down the valley resulting in views concentrated towards the open storage and disturbed areas in the east of the valley. However, a number of views are towards the relatively undisturbed valley floor and sides to the east. Thus, overall they have a visual quality which is medium.	Medium	Views from the village to the north, east and west will become dominated by the main alignment, the So Kwun Wat Link Road and the main interchange. The extent of earthworks, number of viaducts, noise barriers and resultant number of columns will all cause irreversible and dramatic impacts to the visual quality of nearly all views from the village. This will result in the village having very few alternative views, as those along the valley are already over the open storage, or in future will contain CDA and high-rise development. These alternative views will now be dominated by the road. The increase in the night-time light levels, together with the potential for direct glare from the highway lighting will cause additional impacts.	Significant adverse	Significant adverse
So Kwun Wat Tsuen Figure 11.21	42 So Kwun Wat Tsuen village (satellite houses)	This small settlement benefits from screening by the local terrain and has views of the relatively undisturbed valley floor and side resulting in a high visual quality and sensitivity.	High	The satellite houses of village will suffer greatly due to the proximity of the road. The number of viaducts and extent of earthworks will cause major disturbance to the local natural visual character of the hillsides. The columns required to support so many viaducts will create a mass of large scale concrete elements at ground level which will contrast sharply with the existing character.	Significant adverse	Significant adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
				The high number of viaducts will cause major increases in the night-time light levels, which together with the potential for direct glare from the highway lighting may cause additional night-time impacts.		
Local Walking Trails Figure 11.22	43 MacLehose Trail	The MacLehose Trail Section 10 is along the boundary of the Tai Lam Country Park on the northern side of the So Kwun Wat Valley. The vegetation along the trail provides screening in certain sections, however, other parts have open views across the valley or in future will be over the planned CDA and residential areas. At the western end the views are over the open storage sites and of low visual quality. At the eastern end the views are over the relatively undisturbed valley sides and agricultural land on the valley floor.	High	The Route 10 Alignment is likely to cause severe and irreversible impacts to all open views from the trail. At the western end the impact will be lower as the existing views are poor, however the road will run in close proximity to the trail and be a dominating element, particularly considering the extent and height of noise barriers required along the Link Road. At the western end the views will change dramatically in character from the relatively undisturbed valley to major infrastructure interchange.	Significant adverse	Significant adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Western So Kwun Wat Figure 11.22	44 Industrial / Storage Areas	Views from within the western part of the valley are dominated by the areas of open storage for stacked containers. This, in the context of the VSRs being workers results in low visual quality and sensitivity.	Low	The road, and earthworks, will be a major element along northern valley side. However, the low sensitivity of the VSRs, together with the screening afforded by both the local tree planting and open storage areas reduces impacts. Noise barriers along the link road at 3m 5m and a section of semi-enclosure will add to the impacts.	Slight adverse	Slight adverse
Western So Kwun Wat Planned Developments* Figure 11.22	45 Area 48A G/IC 46 Area 55 CDA 47 Area 55 G/IC 48 Area 56 CDA 49 Area 56 PSPS 50 Area 56 G/IC	Views from these planning areas to the site are primarily towards the natural hillside and vegetation of the Tai Lam Country Park to the north. However, the views will also contain major future development of the neighbouring planning areas and the Tuen Mun Road corridor.	Medium	Construction of the proposed road will increase the level of disturbance to the local visual context of this part of the valley reducing the visual amenity of the lower slopes of the natural valleyside. The viaducts will be prominent elements across the landscape at a high level. Area 56 CDA will be particularly affected due to its proximity, while Area 56 PSPS will suffer due to its proximity and the high sensitivity of residential VSRs. Noise barriers along the link road at 3m 5m and a section of semi-enclosure will add to the impacts.	Significant adverse	Significant adverse

* No fixed programme is currently available for the Western So Kwun Wat Developments and this assessment has been based on the So Kwun Wat OZP. They have been included to ensure comprehensive coverage of VSRs in this locality should any developments occur prior to Route 10. Additionally, development layouts are not available and, as such, this assessment has been considered in general terms only.

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
		The sensitivity of the VSRs depends on various factors such as the layout, and building design and orientation. However, in the context that there will be a number of residential areas the sensitivity is increased				
Gold Coast Figure 11.23	51 Gold Coast Residents	There are angled views to the western parts of the valley from the high-rise residential Gold Coast development. These views are open over the highly disturbed storage areas of the valley and surrounding areas. The low quality of the views is countered by the high sensitivity of a large number of residential VSRs.	Medium	Many Gold Coast residents have views across Tuen Mun Road and along the disturbed part of the So Kwun Wat Valley. Route 10 will cause major impacts due to the disturbance that it will cause to the northern valley side. Noise barriers along the link road at 3m 5m and a section of semi-enclosure will add to the impacts.	Moderate adverse	Moderate adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Tuen Mun Road	52 Tuen Mun Road Vehicle Passengers	Views from Tuen Mun Road are along the storage areas of the western part of the So Kwun Wat Valley. The disturbed character of these views result in a low visual quality. Further to the east the views are along the Siu Lam Valley to the new high-rise housing development or to the south for partially screened views over the channel.	Low	Views along the So Kwun Wat valley will suffer due to the link road along the valley side disturbing the natural slopes. Views along the Siu Lam Valley will suffer as the views south over the channel will become further screened by the access ramp, viaduct and noise barriers. However, the low sensitivity and high speed of the VSRs will reduce the impacts substantially. Noise barriers along the link road at 5m vertical and 6m cantilever, semi and full enclosure will add to the impacts.	Slight adverse	Slight adverse
Low-rise Houses	53 Rural Houses	Existing views are dominated by Tuen Mun Road and the local roundabout. In the background is the disturbed ridge along the north side of the Siu Lam Valley and the new high-rise residential development.	Medium	The Siu Lam Link Road will cause major impacts due to the introduction of a viaduct and slope cuttings in close proximity to the houses. The access road will become a dominant element of their visual character. The noise barriers, at 5m vertical and 6m cantilever, semi- and full enclosure, on the viaduct will cause additional intrusion screen large sections of their generally open views, while the highway lighting may cause a raise in ambient light and a potential for direct glare.	Significant adverse	Significant adverse

VSR Group	VSRs	Typical Viewpoint	Sensitivity	Magnitude of Change	Significant Threshold (before implementation of mitigation measures)	
					Cons	Oper
Boat Traffic	54 Ma Wan Channel	Views are along the partially disturbed coastline with Siu Lam valley in the background, dominated by the new high-rise development at the southern end.	High	The Siu Lam Link Road requires a viaduct over a section of relatively undisturbed coastline, at the southern end of the valley. This will cause visual disturbance to one of the few remaining natural coastline areas. The noise barriers, at 5m, 6m and a section of semi and full enclosure on top of the viaduct will substantially increase the height of the elevated structure causing additional intrusion and making it a major element of the views. However, the availability of alternative views reduces the potential impact.	Moderate adverse	Moderate adverse

11.12 Opportunities for Mitigation Measures

Within this Report the mitigation is described for each of the elements of the alignment, i.e. sources of impact, and the proposed design strategies is outlined for mitigation along each of the separate sections of the alignment. The aim of the mitigation measures is:

- to ensure a high standard of the roadscape of the new road;
- to alleviate those landscape and visual impacts unavoidable through the engineering design, where possible; and
- to enhance the existing landscape and visual context of the surrounding areas.

The final preliminary design drawings are given in Appendix I of Volume 2.

Figures 11.24 to 11.29 show the general approaches to the mitigation measures for each of the Route 10 (NLYLH) sections.

The mitigation includes measures for both the construction and operation stages. However, it should be noted that several of these overlap. With respect to the mitigation measures during construction, the nature of the landscape works, i.e. to be undertaken at the end of the civil engineering works, result in the mitigation measures during the construction stages concentrating on the minimisation of impacts, or the retention of landscape elements.

Construction Stage Mitigation Measures

As described earlier, the construction stage mitigation measures concentrate on the minimisation of impacts, as follows:

Slopes

Slope cutting should be minimised where possible, to avoid excessive direct impacts to surrounding areas. Slopes should, therefore, be designed to be as steep as possible within geotechnical constraints. However, the slope design should also be considered in respect of creating opportunity for landscape and visual mitigation, i.e. the potential for planting, which may result in increasing the extent of cutting. A balance will be sought during the Detail Design to satisfy both of these constraints.

Vegetation

Existing vegetation, particularly trees and tree groups will be retained where possible. A tree survey will be undertaken in accordance with WBTC 24/94 to identify all trees affected by the proposed alignment and recommendations given for any tree's retention or transplanting, where appropriate, based on its significance. Efforts should be made to retain groups of trees or woodland where possible.

Topsoils

The extent of earthworks required for Route 10 (NLYLH) will result in the movement of large quantities of topsoil. This topsoil, if worthy of retention, should be stockpiled up to 2m high to prevent anaerobic conditions forming, and for a period not exceeding 12 months, and temporarily vegetated with hydroseeded grass during construction. After completion it should be reused or considered for use in other projects.

Hoardings

Many sections of Route 10 are elevated and are thus unable to be screened during construction. However, the erection of hoardings will be considered for the at-grade sections and particularly around the contractor's compounds to screen the visual clutter caused by plant, stockpiles, etc.

Operation Stage Mitigation Measures

Several of the operation stage mitigation measure are generic items which will be undertaken as general mitigation, e.g. slopes. For simplicity, the mitigation approaches for these items will be described first with more specific landscape proposals for each section being described later.

Slopes

The proposed alignment will require extensive earthworks and the creation of a number of substantial new slopes. At this stage, the preliminary site investigations suggest that there will be several elements to the slopes created. The design of the slopes is subject to engineering constraints, however, at this stage the landscape treatment for all new slopes will be approached as follows:

- Very Steep Cut Slopes into Rock (refer to *Figure 11.30*)

The rock slopes are designed to be as steep as possible to minimise the impacts on the surrounding undisturbed areas. The vertical lift areas should be 7-10m high and separated by flat benches at least 5m wide to safely accommodate drainage, a planter at least 3m wide and a maintenance access. The benches will have planter walls with small trees, shrubs and trailing plants. To avoid emphasising the engineered character of the horizontal rows of benches, the trees will not be planted along the entire length of each bench. It is proposed that they are planted in groups associated between the benches to create a strong vertical element to the slope and give a less engineered appearance. Toe planters at the base of the slopes will also be used to ensure vegetation is present at the base of the slope along the road.

The vertical height of the lifts is varied to create a method of varying the depth and density of planting forming a mosaic effect. The lifts are reduced to 5m height at the lower parts of the slope, adjacent to the road, allowing a denser, more textured planting. This will reflect more natural rock slopes which often have dense vegetation at their base below the exposed rock cliff.

Final blasting of the rock face should be carried out to result in a rough textured finish. This will be undertaken to provide a more visually pleasing appearance and promote the rock faces as cliff features. In particular, consideration will be given during the Detail Design stage to creating rock outcrops as they can be an interesting feature along the road. The rough finish will also provide opportunity for natural vegetation and plant growth

- Steep Cut Slopes into Rock or Intermediate Material (refer to *Figures 11.32 & 11.33*)

A cellular containment system (e.g. Geogrid) or concrete grillage will be used and filled to a minimum depth of 150mm CDG. This will be hydroseeded with a grass / shrub seed matrix to reflect the existing surrounding vegetation patterns.

Where a mix of geogrid, hydroseeding and tree planting on benches is not feasible, the slopes will be hydroseeded with grass and shrub seed mix. This will establish planting on ledges and in pockets resulting in a mosaic of partial vegetation across the slope reducing its visual harshness and engineered appearance.

- Cut Slopes into Soft Material (refer to *Figure 11.34*)

Soft slopes will be present where the cut slopes adjacent to the road are only shallow and also at the interface area on the larger slopes between the rock faces and the undisturbed slopes. These soil areas will be planted with species reflecting the surrounding vegetation patterns.

During the design of the slopes a number of additional considerations will be made, these include:

- the use of shotcrete, which can be a major visual impact, will be minimised on all slopes. It will only be used when all other practicable alternative slope treatments do not satisfy the geotechnical requirements. If shotcrete must be used it should be coloured and patterned to match the surrounding visual environment.
- the use of wire mesh should be considered instead of shotcrete, which should be avoided where possible. This allows the natural textured rockface to show through and can be a visual feature;
- rock slopes should be as steep as possible, within engineering constraints, to minimise the extent of earthworks to the existing landform. However they should be designed to incorporate a variety of benches and lifts, where appropriate. Planting beds should also be incorporated along the roadside at the base of the slope for additional soft landscape where it is not possible to have tree planting on slopes;
- efforts will be made to design contours of the final slopes which tie in with the adjacent landform. However, this should be considered in the context of not causing additional excessive impacts to the adjacent slopes. This approach will be particularly important at the Ng Kwu Leng headland, the Tai Lam Chung Valley contractor compound, and the Siu Lam to So Kwun Wat contractor compound; and
- all slopes should be designed in consideration of WBTC 25/93 Control of Visual Impact of Slopes.

Tsing Lung Bridge

The Tsing Lung Bridge should be considered as a positive feature of the scheme rather than as a negative impact. The Tsing Ma Bridge has demonstrated that such structures can be landmarks of Hong Kong. The long span over the Ma Wan Channel results in major engineering constraints to the type of bridge that may be constructed and the bridge proposed reflects structural design of the adjacent Tsing Ma, Ting Kau and Kap Shui Mun Bridges and will form part of the family of bridges connecting Lantau to the Hong Kong mainland.

The aesthetic value of the bridge depends on its design. The colour scheme, materials used and design of the bridge should all be compatible with the surrounding bridges. However, it should also be a landmark within its own right and should be of a design that balances both compatibility and contrast with the other bridges. Consideration should be given to creating a viewpoint specifically for viewing the bridge, as has been done for the Tsing Ma Bridge. The design of the bridge, together with all other associated structures, will be subject to ACABAS approval.

Other Engineering Structures

Most of the overland sections of Route 10 (NLYLH) and its associated slip roads will be on bridges and viaducts. In many areas, these will be passing through undisturbed or rural landscapes where they will have a significant impact on their landscape and visual character. Full mitigation of the impacts of these engineering structures will not be possible. There is, however, opportunity to design structures that are neutral elements within the landscape and could, in some areas, also become engineering features.

Particular attention is being given to the design, appearance and construction methods of the Route 10 (NLYLH) bridges and viaducts. Landscape consultants and architects are working with the engineers on the aesthetic aspects of the structures and their relationship with the landscape. These are also being reviewed by ACABAS. Several principles have been established:

- the structures should aim to "touch" the ground as lightly as possible in order to minimise disturbance to the existing landscape and vegetation below the structures. this may be achieved by designing slender, rounded columns spaced the maximum distance apart. The deck and parapet will have a shallow profile to reduce its visual intrusion. The viaducts should be constructed using pre-cast methods and launched from columns rather than scaffolding;
- landform and vegetation in areas disturbed by construction works will be reinstated to blend with the existing landscape patterns;
- many structures will be elevated high above the surrounding landscape; wherever light levels permit, vegetation will be reinstated below the structures. Trees and shrubs will be used wherever possible to minimise the apparent height of structures and to soften their appearance from a distance;

- wherever possible, maintenance access roads below the structures should not be provided to minimise impacts on the landscape;
- planting below the viaduct of trees and shrubs will mitigate any direct impacts and reduce the visual impacts caused by the presence of the large columns in the local landscape;
- the structures will have consistent elements for the whole alignment to create a distinctive identity. A narrow profile will be adopted to create a "ribbon" across the landscape;
- columns will be rounded with vertical features to relate to the wider family of structures; including the Tsing Lung bridge;
- at the ground level columns will have a textured finished in-keeping with local architectural and visual environment;
- fair faced concrete will not be used for parapets to minimise glare from the structure and to avoid staining;
- drainage structures will be concealed within the structure;
- consideration will be given to the design and form of traffic sign / sign gantry and street lighting to create single design themes and avoid the structures creating excessive additional impacts. The locations will also be considered to avoid screening key views, e.g. across the Ma Wan Channel;
- in general, lighting along the roadside should be controlled to avoid excessive ambient light levels to the VSRs. However, consideration should also be given to creating night-time visual elements of the structures, particularly the Tsing Lung Bridge; and
- consideration will be given to the design of highway lighting and sign gantries to reduce their potential impacts, in particular to the reducing of ambient light caused by them and in their structural design to ensure a theme across the alignment.

Noise Barriers

Alternative solutions to the noise mitigation have been sought, however, the Noise Impact Assessment has identified noise barriers as the most appropriate measure. The requirement for noise barriers along substantial sections of the alignment is potentially an added source of visual impact. Depending on their location they may introduce a high vertical element and visual barrier along sections of road which are at-grade. On viaducts / bridges, they may increase the depth of the profile of the road causing a slender road deck, when viewed from distance, to become a visually heavy structure.

All barriers and semi-enclosures will be based on a single design theme to create a single family of structures, which will also be integrated with the engineering structures. This will avoid excessive visual clutter along the alignment. This may include approaches such as the use of clear barriers and support posts coloured in tones reflecting the local visual environment. This strategy will reduce the potential overall visual intrusion which barriers may result in.

Planting

An important mitigation for both the landscape and visual impacts is planting to all disturbed areas, and also to improve other areas, where possible. The mitigation planting will consider the following:

- existing planting will be retained where possible. A tree survey will be undertaken in accordance with WBTC 24/94 to identify all trees affected by the proposed alignment and recommendations given for any tree's retention or transplanting, where appropriate, based on its significance. Efforts should be made to retain groups of trees or woodland where possible;
- when planting along the road, a corridor should be identified separate from the utility corridors which impedes landscape works to ensure a high standard of planting along the roadside;
- tree and shrub screen planting will be considered where possible and appropriate. This will include roadside and amenity planting. Where appropriate woodland planting will be suggested, with species reflecting those affected, and shall aim to create a native woodland in the long term. The planting of the disturbed areas will aim to create a fast vegetative cover for quick visual effect and will also aim to allow for native species to become dominant in the long term. More ornamental species may be suggested for areas adjacent to residential developments or along some sections of the road for visual effect;
- revegetation of soil slopes will also be considered to provide visual relief to their engineered character; and
- consideration will be given to possible advance screen planting for contractor compounds.

North Lantau

Within this section are several large cut slopes at Fa Peng, Sam Chuen and Ng Kwu Leng. These will be cut into both soil and rock. For the rock cut slopes, to minimise impacts to the surrounding natural hillsides, the slopes will be cut as steep as possible, generally with a 3 in 1 gradient. The lower parts of these slopes will have 5 to 7m high vertical lift areas with intermediate benches 5m wide. These benches will have at least a 3m wide planting bed comprising tree, shrub and climber planting retained by a granite block wall. On the upper levels of the slope the lift areas will be 10 to 15m high. In general, the upper levels will be left as a cliff feature. Final blasting of the rockfaces should be carried out to leave a rough texture finish where possible and in the context of geotechnical constraints. Shotcreting of slopes will be minimised as far as possible and only used if all alternative designs do not satisfy the geotechnical requirements. If shotcrete must be used it will be coloured and patterned to match the rock face or the surrounding vegetation. Any drainage channels will also be coloured to match their surroundings.

At the base of the slopes adjacent to the road will be toe planters. These will be retained by granite block walls and contain tree and shrub planting including climbers. Species will be more ornamental to provide a visually interesting green corridor for drivers and to visually soften the base of the slopes.

On the intermediate rock / soil areas at the top and side of the slopes geogrid or tensar mats will be used, to stabilise the slopes, with soil placed to full depth and hydroseeded with grass and shrub seed mix. Species will reflect those lost and to match the surrounding vegetation. The top and sides of the slopes will be cut rounded to create a smooth transition between the cut and natural slope areas.

At Ng Kwu Leng, large areas of the slopes will be cut into soil, particularly to the south of the road. These are intended to be cut as stable slopes with typical gradients between 1:1.5 to 1:1.7 and will be planted. At the lower parts of the slopes woodland tree and shrub planting will be used to match the existing surrounding vegetation. At the mid- and upper-level slopes a shrub and grass mix will be planted. This planting will aim to reflect the existing vegetation patterns of the surrounding hillside areas. Species will be selected to reflect those lost and to match the neighbouring vegetation. The top of the slope will be cut rounded to create a smooth transition with the natural hillside.

Additionally at Ng Kwu Leng, platforms will be created for administration, engineering and maintenance areas. Although these areas are subject to detail design, at this stage landscape treatments are proposed around their boundaries. These will comprise woodland planting along the base of the slopes not adjacent to the road and as a buffer along the roadside where slopes are not present. Planting on all slopes will be designed for minimal maintenance.

The areas adjacent to the toll plaza and administration area will be treated with both ornamental planting as a feature landscape and with dense planting as a visual and landscape buffer, particularly between the development and the villages of Fa Peng and Tso Wan. Earth mounding at each end of the administration building will also provide additional screening.

A series of barriers are recommended along the toll plaza adjacent to Fa Peng and Tso Wan. These are proposed to be transparent panels, reducing their visual prominence. The three differing sized barriers should be based on a single form and integrated to avoid visual clutter particularly at their transition between the differing barrier heights. Supports should be coloured with blue / green tones to reflect the tones of the sky / sea. Barriers should be tapered at their ends for a visually smoother transition between the barriers and the road. Where possible planting will be used to screen the barriers.

To the north of the Kap Shui Mun Bridge landfall is an existing area of reclamation and is part of the old works area of the Bridge. Subsequent to works, the compound should be reformed to create natural looking contours blending with the surrounding terrain and planted with trees and shrubs to create a "sheltered wooded valley" area. This is an area which provides opportunity for ecological mitigatory planting.

Any viaduct areas, such as that across Sam Chuen will be constructed with minimum disturbance to the ground and natural landform. Disturbed areas will be planted with species reflecting those lost and to match the surrounding vegetation.

Tsing Lung Bridge

The southern landfall of the bridge is at Kwai Shek and requires the formation of cut slopes into the rock. As with the slopes in the North Lantau section, these slopes will be minimised to avoid impact to the surrounding hillside with a typical gradient of 3:1. The lower areas, with 5 to 7m lifts and 5m benches will be planted with bench planting comprising trees and shrubs retained by a granite block wall. The upper levels will be retained as a rock feature. The intermediate soil / rock slopes at the top and side of the cutting will have geogrid filled with soil and hydroseeded with grass and shrub mix.

A platform will be constructed for the bridge tower. On completion of construction this platform will be graded to allow adequate drainage and covered with topsoil. Tree and shrub planting will be used as a landscape and visual buffer at the base of the tower. A small area to the south of the tower will remain without planting to allow maintenance access.

The preliminary design of the bridge has been formulated to create a new visual feature and landmark across the Ma Wan Channel and also to integrate with the family of bridges comprising the Lantau Link. It is proposed to be a suspension bridge reflecting the form and scale of the Tsing Ma Bridge.

The northern tower of the bridge is on a small area of reclamation projecting into the Channel to the east of Grand Bay Villa. This area is proposed to be a seating area including buffer planting along Castle Peak Road, a promenade walk and ornamental planting. It will also serve as a viewpoint for the bridge and Channel.

Between Castle Peak Road and Tuen Mun Road, adjacent to the northern landfall of the bridge will be administration and maintenance facilities. These areas will be landscaped with ornamental trees and shrub complementing the built form, but without obstructing views. The existing access road to the former quarry will be upgraded to provide access to this administration area. Ornamental tree planting is proposed along the road.

To the west of this area is a contractor compound. This is proposed to be the site of a viewpoint for the Bridge and should comprise recreational facilities such as sitting out areas, picnic tables, barbecue sites, shade structures and an elevated viewing platform. Planting is proposed to be a mix of native woodland species, together with more ornamental species adjacent to the recreational areas. The site could also be accessed from Castle Peak Road along the administration area access road.

The slope cutting above the tunnel portal will be minimised and will be retained as a cliff feature. Planting on this slope will not be possible due to access constraints. The final blasting of the rockface should aim to result in a highly textured finish. Shotcrete will be avoided where possible. Where shotcrete is a requirement, it will be coloured reflecting the rock striations or the surrounding vegetation. Drainage channels will also be coloured to match their surroundings.

A contractor's compound is proposed in a disused quarry floor to the east of the bridge off Castle Peak Road. As it is a possible R(C) site, it is proposed to be grass hydroseeded only to provide vegetative cover for the short term, prior to any development.

Tsing Lung Tau to Siu Lam

The southern part of this section is enclosed within a bored tunnel and will not require any landscape treatment. The northern tunnel portal, however, will be cut from the upper natural slopes of the Tai Lam Chung Valley. Additionally a large contractor compound, including a site for the magazine (to store explosive material for tunnel excavation and slope cutting) is proposed to the north and south of the tunnel portal with a temporary access road to the south. These areas will require clearance and disturbance to the landform. A primary mitigation measure is, therefore, to clearly delineate an actual works area required by the contractor separate from the area of

protection around the munitions store in order to minimise the landscape and visual impacts to the local terrain and vegetation. Subsequent to works, the areas disturbed during construction should be reinstated with natural looking contours and with woodland and shrub vegetation reflecting the local species.

Cut slopes into rock will be required above and adjacent to the tunnel portal. These will be of similar design to those on the earlier sections. Toe planters along the roadside with tree and shrub planting, planting on the lower bench areas and a cliff feature on the top slopes. The use of shotcrete will be avoided wherever possible. In situations where no alternative geotechnical treatment is feasible, the shotcrete will be coloured and a pattern formed across its face reflecting the natural striations of the rock or reflecting the tonal qualities of the surrounding vegetation. Drainage channels will also be coloured to match their surroundings.

The viaduct over the Tai Lam Chung Valley will be constructed using methods to minimise disturbance at ground level, such as using insitu sections launched from columns rather than using scaffolding. Tree and shrub planting will be used at the column bases to provide landscape and visual buffering to the structures at ground level.

An extensive cut is required through the Siu Lam Ridge to the east of the Tai Lam Chung Valley. This will be cut into rock resulting in a cut face upto 60m high. The slopes will be cut at 3:1 gradients to minimise disturbance to the surrounding natural hillslopes and to maintain a natural ridgeline when viewed from the south. Toe planters with trees and shrubs, including climbers, will provided and retained by granite block walls to provide a visual buffer along the base of the slope and to create a vegetated corridor for the drivers along the road. These will comprise more ornamental species from interest.

The lower half of the slopes will comprise 5 to 7m vertical lifts with 5m wide benches. Tree and shrub planting will be used along these benches. The planting will be designed in vertical groups rather than consistently along each bench. This is intended to avoid reinforcing the engineered horizontal character of the slopes by introducing more vertical elements. The upper part of the slopes will remain as a cliff feature with 10 to 15m high lifts and minimum width benches. The final blasting of the rock face should create a rough textured finish to the rock face, where possible. Shotcrete will be avoided where possible. Where no alternative is available, it will be coloured to reflect the rock striations. The intermediate soil / rock areas at the top and sides of the slopes will have geogrid filled with soil and hydroseeded with grass and shrub mix. All species will reflect those lost and match the existing vegetation.

Siu Lam to So Kwun Wat

A viaduct is proposed across the Siu Lam Valley. As with the Tai Lam Chung viaduct this should be constructed using methods to minimise disturbance at ground level by launching insitu concrete sections from columns. Disturbed areas around the columns will be planted with trees and shrubs to provide a visual and landscape buffer at the ground level.

A 1.5m barrier is recommended on the viaduct across the Siu Lam Valley. This is proposed to be transparent panels to minimise the impacts of the viaduct by maintaining a visually thin deck as far as possible.

Across the top of the already disturbed ridge to So Kwun Wat a series of cut slopes into rock will be required. As with other rock slopes, these will be cut at 3:1 to minimise disturbance to surrounding hillsides and landscaped with toe planters, tree and shrub planting on the lower benched slopes, a cliff feature on the upper slopes and grass and shrub planting on the intermediate soil / rock areas.

Adjacent to the Siu Lam Link Road junction, an administration building is proposed. The areas around this building will be landscaped with earth mounds and ornamental planting to provide a landscape and visual buffer while complementing the building.

The northern parts of the Siu Lam Link Road will require formation of new cut rock slopes. These will be landscaped in a similar design to those at the junction. The southern part of the Link Road will primarily be on viaduct. Construction methods will be used to minimise disturbance at the ground level such be use of pre-cast unit launched from columns. All areas below the columns will have reinstatement planting matching that lost and reflecting the surrounding vegetation.

The Noise Impact Assessment recommendations include a series of barriers, together with a section of semi-enclosure along the Siu Lam Link Road. The vertical barriers, and semi-enclosure are proposed to be transparent panels, all based on a single design form. This will reduce the visual intrusion of the structures, particularly in the context that large sections will be on viaduct and highly visible. The barriers will be designed to be an integral part of the structure to create a single form. For sections of barriers along the road at-grade, clear panels are also proposed to maintain the design theme and reduce their visual intrusion. They will also benefit from the opportunity of having adjacent screen planting. The barriers should be tapered at the ends to provide a smoother transition to the roadside.

The So Kwun Wat Link Road will be constructed along the northern side of the So Kwun Wat Valley and will comprise sections on viaduct, through cutting and on fill slopes. As with viaducts on other parts of the scheme, these will be constructed using methods to minimise disturbance to the surrounding hillside by using launched pre-cast units. The cut slopes will be treated as elsewhere with toe planters, tree and shrub planting on the lower benched slopes, cliff feature at the upper slopes and grass and shrub hydroseeding on geogrid on the intermediate soil / rock areas. Fill slopes will formed with a soft finish capable of sustaining tree and shrub planting.

A series of barriers and full enclosures are recommended along the Link Road and access slip roads to Tuen Mun Road. These are proposed to be transparent panels reducing their visual intrusion as far as possible, particularly as long sections are on elevated viaducts. The at-grade sections will benefit from the opportunity of having adjacent screen tree planting. The barriers should be tapered to provide a smoother finish to the transition at the ends. Allowance will be made to create a dense planting area adjacent to the noise barriers to create additional screening with trees and shrubs.

Additional areas on the ridge between Siu Lam and So Kwun Wat will be required as contractor compounds. These will generally affect the already heavily disturbed areas of the ridge and will, in the long term, be permanently occupied by the road and administration buildings. Any additional areas, however, will be regraded with naturalistic contours and planted with woodland tree and shrub vegetation. Two planned development sites along Tuen Mun Road are also proposed as contractor compounds. On completion of works these areas will be hydroseeded with grass only to provide vegetative cover prior to development.

The Ecological Impact Assessment has identified that 0.2 Ha of Fung Shui woodland will be lost in this section at So Kwun Wat. A tree survey of this area will be undertaken to identify those trees of particular importance. Avoidance of these trees will be recommended is possible, otherwise they will be considered for their transplantability. Compensatory planting will also be undertaken to replace the species lost.

11.13 Residual Impacts Subsequent to Mitigation

The scale of the scheme, particularly the requirement for major cut slopes and high level viaducts, will result in a number of residual impacts. The scale of the impacts incurred due to the works is, in several locations, too large to be totally mitigated. This is generally due to the works creating a major change in the local landscape and visual character of the area due to the extent of slope cutting, such as Siu Lam and Ng Kwu Leng, or the introduction of high level viaducts across valleys, such as Tai Lam Chung and Siu Lam. However, this is offset by opportunities to enhance several already disturbed area of poor quality, such as the works area on North Lantau, the Tsing Lung Tau area and the disturbed areas across the Siu Lam to So Kwun Wat Ridge.

These types of impact are difficult to successfully alleviate at source using purely landscape mitigation measures. Although the mitigation measures will provide some relief to the impacts caused, this will be limited and many of them will still cause major intrusion to the landscape and visual context along the alignment.

The mitigation measures will mitigate many of the construction impacts, i.e. construction scars, but cannot mitigate the impact of large scale manmade features within areas of natural landscape. Permanent structures will cause permanent impacts because of their scale, character and visibility within the landscape. This arises due to the road being along an alignment which contrasts with the landscape form rather than following it. Summaries of the impacts, mitigation measures and residual impacts are given in *Tables 11.3 and 11.4*.

A series of perspective sketches and sectional elevations are shown on *Figures 11.36* to *11.49*.

With respect to the North Lantau section of Route 10 (NLYLH) a series of cross sections and close-up perspectives are shown in *Figures 11.69 – 11.74*.

Photomontage Visualisations

A series of photomontage visualisations have been formulated to demonstrate the visual impacts and, where application, the effect of the previously described mitigation measures including their development after 1 and 10 years (refer to *Figures 11.44a* to *11.66*). The viewpoints for these photomontage images have been selected to be representative of the key visually sensitive receivers. However, several site conditions have prevented images being formulated from certain VSRs, e.g. Fa Peng and Tso Wan for the following reasons:

- prevention of access due to private land; and
- ongoing construction works preventing access across a site or temporary works, i.e. temporary hoarding, screening normal view.

In this situation an alternative approach has been used, namely to use an aerial photograph where possible. The proposed road has been superimposed onto this photograph to show the overall context of the VSR and surrounding areas in respect of the scheme. The visual impact can then be inferred from the image.

Table 11.3: Summary of Mitigation Measures and Residual Landscape Impacts

R – Impact on Landscape Resource, C – Impact on Landscape Character

Landscape Character Unit LCU	Sources of Impact	Type of Impact	Magnitude of Change		Landscape Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
North Lantau Section								
LCU 1 *Village Areas*	Loss of natural coastline and coastal bay location Introduction of reclamation and infrastructure character	R/C	High	High	High	Retention of lagoons adjacent to villages (not feasible under NSLDFS) Creation of mounding and planted buffer zone at edges of administration area and toll plaza	Significant adverse	Significant adverse
LCU 2 *Transport Corridor*	Little impact to this LCU as it is already an area of high disturbance	R/C	Low	Low	Low	Creation of natural looking contours tying in with the local terrain and native woodland planting in contractor compound north of Kap Shui Mun Bridge landfall. Acts as partial mitigation for landscape impacts occurring elsewhere along the alignment	Slight adverse	Slight adverse

Landscape Character Unit LCU	Sources of Impact	Type of Impact	Magnitude of Change		Landscape Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
LCU 3 *North Lantau Natural Hillside and Coastline*	Disturbance to natural slopes to the north of the toll plaza across the Sam Chuen promontory Major earthworks across the Ng Kwu Leng headland and requirements of large cut slopes Change of character of LCU from natural headland to major road interchange	R/C	High	High	High	Minimisation of slope cutting Design of slopes to create a less regular and engineered appearance Partial vegetation of slopes Creation of a feature landscape as a gateway to Hong Kong including sculptural mounding, planting and the integration of the bridge elements and any ancillary buildings blending the scheme with the surrounding landscape and preserving the remaining natural character as far as possible	Significant adverse	Significant adverse
Tsing Lung Tau Bridge Section								
LCU 3 *North Lantau Natural Hillside and Coastline*	Disturbance to the natural coastline and vegetation	R/C	Medium	Medium	High	Minimisation of earthworks Reinstatement of natural looking contours and vegetation where possible	Significant adverse	Significant adverse

Landscape Character Unit LCU	Sources of Impact	Type of Impact	Magnitude of Change		Landscape Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
LCU 4 *Disturbed Hillside*	Loss of naturally regenerating vegetation in quarry floor Disturbance to natural slopes and ridgeline above the tunnel portal The existing quarry access road from Castle Peak Road will be widened into a haul road resulting in additional impacts to adjacent vegetation	R/C	High	High	Medium	Tunnel portal to be sensitively designed to integrate with surrounding areas. Minimisation of earthworks Design of slopes to reduce engineered appearance Creation of viewpoint and amenity facilities within landscaped area on contractor compound adjacent to tunnel portal Revegetation of disturbed areas	Significant adverse	Significant adverse
LCU 5 *Transport Corridor*	Alignment is enclosed in a bored tunnel with no impact.	No impact	None	None	None	None	No Impact	No Impact
LCU 6 *Natural Hillsides*	Alignment is enclosed in a bored tunnel with no impact	No impact	None	None	High	None	No Impact	No Impact

Landscape Character Unit LCU	Sources of Impact	Type of Impact	Magnitude of Change		Landscape Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Tsing Lung Tau to Siu Lam Section								
LCU 6 *Natural Hillsides*	Disturbance to natural terrain and vegetation above quarry, due to tunnel portal, and for contractor compound. A haul road will also be constructed from the tunnel portal to the existing access road. This will exacerbate the impacts	R/C	Medium	Medium	High	Minimisation of earthworks and site clearance for contractor compound On completion of construction, complete reinstatement of natural looking contours, particularly including the cut slopes for the tunnel, and vegetation blending with the surrounding undisturbed hillside	Significant adverse	Significant adverse
LCU 7 *Tai Lam Chung Valley*	Disturbance to valley floor, including vegetation, due to construction of viaduct columns	R/C	Medium	Medium	Medium	Minimisation of disturbance to valley floor during construction by employing offsite pre-casting of viaduct sections and launched from columns Tree and shrub planting around base of columns	Moderate Adverse	Moderate adverse
LCU 8 *Siu Lam Ridge*	Major disturbance due to alignment requiring large scale and high cut slopes and bisecting ridge	R/C	High	High	High	Minimisation of earthworks and slope cutting, particularly to retain ridgeline when viewed from north and south Partial vegetation of cut rock slopes	Significant adverse	Significant adverse

Landscape Character Unit LCU	Sources of Impact	Type of Impact	Magnitude of Change		Landscape Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Siu Lam to So Kwun Wat Section								
LCU 9 *Siu Lam Valley*	Disturbance to valley floor, including houses, vegetation and potential *Fung Shui* woodland, due to construction of viaduct columns	R/C	Medium	Medium	High	Minimisation of disturbance to valley floor during construction by employing offsite pre-casting of viaduct sections and launching from columns Tree and shrub planting around base of columns	Significant adverse	Significant adverse
LCU 10 *Disturbed Ridge*	Earthworks to already disturbed ridge by main alignment and construction of administration buildings Major disturbance caused by the Siu Lam link road across areas of the natural hillsides to the west of the Siu Lam Valley and to the west of Tuen Mun Road	R/C	High	High	Low	Design of slopes across the existing disturbed ridge to create more natural looking contours adjacent to the main alignment with, if possible a soft finish, and planted Provide vegetation to the existing poorly vegetated ridge areas Minimisation of slope cutting along Siu Lam link road and partial vegetation of rock slopes	Moderate adverse	Moderate adverse

Landscape Character Unit LCU	Sources of Impact	Type of Impact	Magnitude of Change		Landscape Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
LCU 11 *Eastern So Kwun Wat Valley*	Disturbance to the relatively undisturbed valley floor causing a change character to a major road interchange Extensive disturbance and slope cutting along the valley side to the natural terrain and vegetation	R/C	High	High	High	Minimisation of disturbance to valley floor during construction works by employing offsite manufacture of viaduct sections and launching from columns Tree and shrub planting around base of columns and below viaduct Minimisation of slope cutting along valley side Partial vegetation of rock slopes	Significant adverse	Significant adverse
LCU 12 *Western So Kwun Wat Valley*	Only limited disturbance to poor quality valley floor	R/C	Low	Low	Low	Minimisation of works Full reinstatement of all areas disturbed and enhancement of vegetation	Slight adverse	Slight adverse
LCU 13 *Natural Hillside*	Extensive earthworks along the valley side causing disturbance to the natural hillside and loss of vegetation	R/C	Medium	Medium	High	Minimisation of slope cutting along valley side Full landscape reinstatement is not possible due to the nature of the slopes therefore only partial vegetation cover will be possible Reinstatement of disturbed roadside areas where possible	Significant adverse	Significant adverse

Table 11.4: Summary of Visual Mitigation Measures and Operational (Residual) Impacts

Several areas within the Study Area are indicated on the So Kwun Wat OZP for planned development, particularly in the So Kwun Wat and Siu Lam Valleys. At this stage there is only limited information available in these areas. These planned developments have been included within the assessment where possible, however, the assessment can only be expressed in broad and general terms. Noise barriers are an additional source of impact and their presence will exacerbate and impact rather than be the sole source of impact. (Refer to Figures 11.10 and 11.11)

R – Impact on Visual Resource, C – Impact on Visual Character

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
North Lantau Section								
Local Villages 1 Fa Peng 2 Tso Wan	Loss of open views across bay due to reclamation and noise barriers Introduction of views of administration area, buildings, toll plaza Glare from highway lighting	R/C	High	High	High	Design of transparent noise barriers Creation of mounding and tree and shrub planting at each end of administration area to screen buildings at lower level and reduce their apparent height Careful location and use of directional highway lighting fixtures to reduce glare to VSRs to minimise glare to VSRs	Significant adverse	Significant adverse

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
East Lantau Planned Reclamation[•] 3 Potential Tourist and Recreational Uses (currently zoned Undetermined)	Introduction of administration buildings, toll plaza, noise barriers and road in front of natural hillside	R/C	High	High	High	Mounding and planting adjacent to administration area as visual buffer and to screen buildings at lower level and reduce their apparent height Building to be recessive in the landscape by reducing the building mass by design , detail and colour Design of transparent noise barriers	Significant adverse	Significant adverse
Ma Wan Channel 4 Boat Traffic	Introduction of slope cutting bisecting the natural Ng Kwu Leng headland Alternative views available	R/C	High	High	High	Design of viaduct with thin profile and narrow columns Screen and buffer planting along road, viaduct and around columns Mounding and planting on the contractor compound will benefit views as a visual buffer to the works	Significant adverse	Significant adverse

[•] The team is not aware of a committed programme for the implementation of any tourist or recreational facilities on the reclamation, hence this assessment can only be expressed in general terms. It has been included to ensure comprehensive coverage of VSRs at this location should any development occur prior to Route 10. Additionally, the planned facilities are currently subject to further studies. They are currently at the early stages and it is not possible to be definitive concerning the impacts.

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Kap Shui Mun Channel 5 Boat Traffic	Screening of the natural coastline, bay and villages of Fa Peng and Tso Wan Introduction of the by the elevated road across the Yi Chuen and Sam Chuen headland Alternative views available	R/C	Medium	Medium	High	Design of viaduct with thin profile and narrow columns Screen and buffer planting along road, viaduct and around columns Mounding and planting on the contractor compound will benefit views as a visual buffer to the works	Significant adverse	Significant adverse
Ma Wan 6 Proposed Theme Park 7 Village Resite 8 Proposed High-rise Residential Development	The road will be a prominent element of the North Lantau coastline and will severely detract from the existing views. Glare from highway lighting	R/C	High	High	Medium	Mounding and advance planting on the contractor compound will benefit views as a visual buffer to the works Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Significant adverse	Significant adverse
Lantau Link and North Lantau Highway 9 Commuters / vehicular passengers	Disturbance to the Ng Kwu Leng headland and coastline Introduction of the viaduct along the coast	R/C	Medium	Medium	High	Minimisation of slope cutting Partial planting of slopes and around columns Mounding and planting on the contractor compound will benefit views as a visual buffer to the works	Moderate adverse	Moderate adverse

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Sham Tseng to Hong Kong Garden 10 Hong Kong Garden 11 Possible R(B) zone to the west of Hong Kong Garden	Disturbance to the natural Ng Kwu Leng headland and extent of slope cutting	R/C	High	High	High	Design of slope cutting with a smoother and more curved form to reduce the straight cut engineered appearance and create a feature Partial vegetation to soften the harsh rockface	Significant adverse	Significant adverse
Tsing Lung Tau to Sham Tseng 12 Sham Tseng	Disturbance to the natural Ng Kwu Leng headland and extent of slope cutting	R/C	Medium	Medium	Medium	Design of slope cutting with a smoother and more curved form to reduce the straight cut engineered Partial vegetation to soften the harsh rockface	Moderate adverse	Moderate adverse
Tsing Yi 13 West Tsing Yi Industrial Areas	Slight intrusion due to the reclamation for the road and toll plaza	R/C	Low	Low	Low	None	Moderate adverse	Moderate adverse

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Tsing Lung Tau Bridge Section								
Ma Wan 14 Proposed Theme Park 15 Village Resite 16 Proposed High-rise Residential Development	The bridge will be a visual feature in views, however, highway lighting may cause glare Tunnel portal, ventilation and administration buildings will be major elements Alternative views available Additional impacts during construction due to conveyor belt, barging and haul road	R/C	Medium	Medium	High	The bridge should be designed to create a landmark and feature over the channel and should add to the family of bridges with the Lantau Link Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Significant adverse	Change in character as bridge is a visual feature and landmark
Lantau Link and North Lantau Highway 17 Commuters / vehicular passengers	The bridge will be a visual feature in views Tunnel portal, ventilation and administration buildings will be major elements Additional impacts during construction due to conveyor belt, barging and haul road	R/C	High	High	High	The bridge should be designed to create a landmark over the channel and should add to the family of bridges with the Lantau Link	Significant adverse	Change in character with bridge as visual feature and landmark

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Castle Peak Road 18 Castle Peak Road	From a distance the bridge will be a visual feature, however, in close proximity, the columns and deck overhead will cause intrusion to views Additional impacts during construction due to conveyor belt and barging	R/C	High	High	Low	The bridge should be designed to create a landmark over the channel.	Slight adverse	Slight adverse
East Ma Wan Channel 19 Hong Kong Garden 20 Possible R(C) zone west of Hong Kong Garden 21 Yuen Tun Village 23 Local beaches 24 Sham Tseng	VSRs in close proximity will suffer major intrusion due to the introduction of the structural elements of the bridge, e.g. towers and underside of the deck Potential increase of ambient light from the highway lighting Additional impacts during construction due to conveyor belt, barging and haul road Tunnel portal, ventilation and administration buildings will be major elements	R/C	High	High	High	The bridge should be designed to create a landmark over the channel Careful location and use of directional highway lighting fixtures to reduce glare to VSRs No feasible mitigation for VSRs close to the bridge	Significant adverse	Significant adverse

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Tseun Wan 25 Tseun Wan	The bridge will be a visual feature in views	R/C	Medium	Medium	High	The bridge should be designed to create a landmark over the channel and should add to the family of bridges with the Lantau Link	Moderate adverse	Change in character of views with bridge as a visual feature and landmark
Ma Wan Channel 26 Boat Traffic	The bridge will be a visual feature in views Additional impacts during construction due to conveyor belt, barging and haul road Tunnel portal, ventilation and administration buildings will be major elements Alternative views available	R/C	Medium	Medium	High	The bridge should be designed to create a landmark over the channel and should add to the family of bridges with the Lantau Link	Significant adverse	Change in character with bridge as visual feature and landmark
West Ma Wan Channel 27 Ka Loon Tsuen	Ka Loon Tsuen will suffer intrusion due to its proximity Additional impacts during construction due to conveyor belt, barging and haul road	R/C	High	High	Medium	The bridge should be designed to create a landmark over the channel and particularly the design of the towers and underside of the deck	Moderate adverse	Change in character with bridge as visual feature and landmark
28 Gold Coast	For Gold Coast the bridge will be a visual feature	R/C	High	High	Medium	The bridge should be designed to create a landmark over the channel	Moderate adverse	Change in character with bridge as visual feature and landmark

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Tsing Lung Tau to Siu Lam Section								
South Tai Lam Chung Valley 29 Tai Lam Chung Tsuen	Introduction of high level viaduct, although much is screened Earthworks and high cut slopes through Siu Lam Ridge Potential increase in night-time ambient light due to highway lighting	R/C	High	High	High	Design of viaduct with thin profile and narrow columns Tree and shrub planting around columns Partial vegetation of Siu Lam cut slopes Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Significant adverse	Significant adverse
30 Luen On San Tsuen 31 Wong Uk 32 Wu Uk 33 Tai Lam Chung Sea Activities Centre	Introduction of high level viaduct, although much is screened Earthworks and high cut slopes through Siu Lam Ridge Potential increase in night-time ambient light due to highway lighting Views not greatly affected due to topography, vegetation and distance	R/C	Medium	Medium	Low	Design of viaduct with thin profile and narrow columns Tree and shrub planting around columns Earthworks will only result in partial vegetation of Siu Lam cut slopes being possible Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Slight adverse	Slight adverse
34 Tuen Mun Road	Introduction of high level viaduct across the valley	R/C	Medium	Medium	Low	Design of viaduct with thin profile and narrow columns	Slight adverse	Slight adverse

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
North Tai Lam Valley 35 Rural Houses 36 Correctional Institution	Main impacts arising from the columns at ground level Possible increase in ambient light level due to highway lighting	R/C	Medium	Medium	Low	Consideration of the design of the finish to the columns Tree and shrub planting around columns Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Slight adverse	Slight adverse
Ma Wan Channel 37 Boat Traffic	Introduction of high level viaduct across the valley	R/C	Medium	Medium	High	Design of viaduct with thin profile and narrow columns	Moderate adverse	Moderate adverse
Siu Lam to So Kwun Wat Section								
Siu Lam Village 38 Siu Lam Village	Main impacts arising from columns within village areas as viaduct is over 30m overhead Possible increase in ambient light levels due to highway lighting	R/C	High	High	High	Consideration of the design of the finish to the columns Tree and shrub planting around columns Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Significant adverse	Significant adverse

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Siu Lam Development 39 High-rise residential development 40 CDA*	V[illegible]s primarily affected due to introduction of the high level viaduct across the valley Views south affected due to the Siu Lam link road, including noise barriers, in front of the Ma Wan Channel Possible increase of the ambient light due to highway lighting	R/C	High	High	High	Design of viaduct with thin profile and narrow columns Careful location and use of directional highway lighting fixtures to reduce glare to VSRs Design of transparent noise barriers	Significant adverse	Significant adverse
So Kwun Wat Tsuen 41 So Kwun Wat Tsuen village (main village)	Views to the north and east affected by the viaduct interchange causing visual intrusion to their existing views of the largely undisturbed valley Lack of alternative views Possible increase in ambient light levels due to highway lighting	R/C	High	High	Medium	Design of viaduct with thin profile and narrow columns Tree and shrub planting around columns Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Significant adverse	Significant adverse

* No information or programme concerning committed developments in the Siu Lam CDA is available at this stage and a detailed assessment is not possible. This CDA is indicated on the So Kwun Wat OZP and has been included within this assessment to ensure comprehensive coverage of the VSRs within this vicinity should any development occur prior to Route 10.

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
So Kwun Wat Tsuen 42 So Kwun Wat Tsuen village (satellite houses)	Views to the north and east affected by the interchange, with several viaducts, causing visual intrusion to their existing views of the largely undisturbed valley Earthworks along the main alignment across the valley sides Possible increase in ambient light levels due to highway lighting	R/C	High	High	High	Minimisation of slope cutting Partial vegetation of slopes Design of viaduct with thin profile and narrow columns Tree and shrub planting around columns Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Significant adverse	Significant adverse
Local Walking Trails 43 MacLehose Trail	Major intrusion to views from the eastern end due to the introduction of the viaduct interchange to the relatively undisturbed valley floor and side Western end less affected as views are of primarily disturbed land	R/C	High	High	High	Design of viaduct with thin profile and narrow columns Tree and shrub planting around columns	Significant adverse	Significant adverse

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Western So Kwun Wat 44 Industrial / Storage Areas	Extensive slope cutting along So Kwun Wat link road Introduction of sections of viaduct for the So Kwun Wat link road along the northern valley side Low sensitivity of VSRs	R/C	High	High	Low	Minimisation of slope cutting Partial vegetation of slopes Design of viaduct with thin profile and narrow columns	Slight adverse	Slight adverse
*Western So Kwun Wat Planned Developments** 45 Area 48A G/IC 46 Area 55 CDA 47 Area 55 G/IC 48 Area 56 CDA 49 Area 56 PSPS 50 Area 56 G/IC	Extensive cut slopes along the northern valley side Introduction of sections of viaduct for the So Kwun Wat link road along the northern valley side Intrusion to views of natural hillside	R/C	High	High	Medium	Minimisation of slope cutting Partial vegetation of slopes Design of viaduct with thin profile and narrow columns Planting to disturbed areas along the road side, where possible	Significant adverse	Significant adverse

* No fixed programme is currently available for the Western So Kwun Wat Developments and this assessment has been based on the So Kwun Wat OZP. They have been included to ensure comprehensive coverage of VSRs in this locality should any developments occur prior to Route 10. Additionally, development layouts are not available and, as such, this assessment has been considered in general terms only.

VSR Group and VSRs	Sources of Impact	Type of Impact	Magnitude of Change		Visual Sensitivity	Mitigation Measures	Residual Impact after Implementation of Mitigation Measures	
			Cons	Oper			Cons	Oper
Gold Coast 51 Gold Coast Residents	Extensive slope cutting to the natural northern valley side Introduction of viaduct sections	R/C	High	High	Medium	Minimisation of slope cutting Design of viaduct with thin profile and narrow columns Planting to disturbed areas along the road side, where possible	Moderate adverse	Moderate adverse
Tuen Mun Road 52 Tuen Mun Road Vehicle Passengers	Low sensitivity of VSRs Introduction of viaduct sections and access slip roads	R/C	High	High	Low	Design of viaduct with thin profile and narrow columns	Slight adverse	Slight adverse
Low-rise Houses 53 Rural Houses	Major visual intrusion due to the Siu Lam link road viaduct, including noise barriers Possible increase in ambient light levels due to highway lighting	R/C	High	High	Medium	Design of viaduct with thin profile and narrow columns Design of transparent noise barriers Tree and shrub planting around columns Careful location and use of directional highway lighting fixtures to reduce glare to VSRs	Significant adverse	Significant adverse
Boat Traffic 54 Ma Wan Channel	Intrusion due to introduction of viaduct sections of the Siu Lam link road, including noise barriers Alternative views are available	R/C	Medium	Medium	High	Design of viaduct with thin profile and narrow columns Design of transparent noise barriers	Moderate adverse	Moderate adverse

11.14 Implementation, Management and Maintenance of the Landscape Works

The landscape works are considered to be largely softworks, together with certain hardworks including public footpaths and non-highways street furniture (seating, etc.). The softworks maintenance, subsequent to establishment works, anticipated for the works include the following:

- roadside tree planting - minimal maintenance intended as it would potentially require temporary lane closure and access is a major constraint, water retaining crystals would be incorporated and species selected to minimise watering requirements;
- rock slope planting - planting will be designed to require minimal maintenance as safe access to the benches is a major constraint, species will be selected to be drought tolerant and water retaining crystal will be incorporated into planting medium;
- soft slope planting - this generally comprises woodland mixes and will be of very low maintenance; and
- ornamental planting - ornamental amenity planting will be restricted to areas with public access and for particular visual interest, planting will require watering and general maintenance to maintain a high quality, it will only be located in areas which have sufficient and safe access sufficiently large for maintenance vehicle.

In general *Table 11.5* outlines the implementation, management and maintenance responsibilities for the roadside landscape works and items associated with this project and is based on WBTC 18/94.

Table 11.5 Implementation, Management and Maintenance of Roadside Landscape Works within the Highways Reserve

Landscape Item	Proposed Implementation	Management Department	Maintenance Department
Roadside hardworks	HyD	HyD	HyD
Roadside planting	HyD	RSD	RSD
Noise Barriers	HyD	HyD	HyD

As there are several areas which are not covered by the above, i.e. cannot be classified as "roadside landscape", *Table 11.6* outlines the implementation, management and maintenance responsibilities associated "non-roadside" areas.

Table 11.6 Implementation, Management and Maintenance of Non-Roadside Landscape Works

Landscape Item	Proposed Implementation	Management Department	Maintenance Department
Slope planting	HyD	HyD	HyD
Amenity Areas	HyD	RSD	ASD / RSD
Woodland planting on contractor compound north of KSM Bridge	HyD	HyD	HyD
Seating Area on Reclamation for Northern Tower	HyD	HyD	HyD
Tsing Lung Tau Viewpoint	HyD	HyD	HyD
Woodland planting on Siu Lam / So Kwun Wat Ridge	HyD	HyD	HyD
Temporary planting on Planned Development sites along Tuen Mun Road and Possible R(C) site	HyD	HyD	HyD

It should be noted that, at this stage, the above table only outline the basic areas of responsibility and provides guidelines. The actual demarcation of management / maintenance area responsibilities will be sought from, and approved by, relevant Government departments during the Detail Design stage.

Programme for Landscape Works

The landscape works will closely follow the completion of the civil engineering contracts, as follows:

	Work Element	Approx Timescale	Landscape Works
Advance Works	Advance works for Tsing Lung Bridge, including excavation at Kwai Shek	Q2 2001 - Q1 2002	na
Major Contracts	(i) Tsing Lung Bridge	Q2 2002 - 2007	2007
	(ii) Lantau Toll Plaza	Q2 2002 - 2007	2007
	(iii) Tai Lam Chung Tunnel	Q2 2002 - 2007	2007
	(iv) So Kwun Wat Inter-change and Link Road	Q2 2002 - 2007	2007
	(v) Siu Lam Link Road	Q2 2002 - 2007	2007

At this stage, the above programme is preliminary and subject to finalisation during the Detail Design stage.

The landscape maintenance for softworks are expected to include:

- regular maintenance, including irrigation, pruning, etc. for ornamental trees and shrubs, all ornamental areas will be accessible by maintenance vehicle; and,

- informal maintenance for woodland planting. All woodland planting will be designed to be low maintenance and requiring no regular maintenance programme, particularly when along a roadside or in an area more difficult to access. Maintenance will be on an on-call basis only.

11.15 Planning and Development Review

North Lantau

In general, the alignment runs through Green Belt zones adjacent to Yi Chuen and Ng Kwu Leng. There is a general presumption against development within these Green Belt zones, although, the general alignment of the road (subject to detail design) is indicated on the Draft North-East Lantau Outline Zoning Plan (OZP) No. S/I-NEL/5. However, the slope cuttings adjacent to the road, particularly at Ng Kwu Leng will encroach into the neighbouring Green Belt zones.

With respect to the planned future reclamation along the eastern coast, the general Route 10 (NLYLH) alignment is indicated on the OZP No S/I-NEL/5 between the Green Belt zones of Lantau and the planned reclamation areas. These reclamation areas are indicated in the non-statutory Explanatory Statement associated with the OZP as being areas with possible uses including tourism, recreation and other compatible uses which are low-intensity and low-rise in nature. As the extent of reclamation associated with the road is minimised to adjacent to the alignment, any future reclamation to the east should consider the road as a major element and incorporate sufficient landscape buffer zones to avoid excessive intrusion to the future facilities.

Tsing Lung Tau Bridge Section

The general alignment of Route 10 (NLYLH) (subject to detail design) has been indicated on the OZP No. S/I-NEL/5. However, the slope cuttings adjacent to the bridge towers may result in encroachment into the Green Belt area adjacent to Kwai Shek.

The northern landfall, tunnel portal and administration areas are all located within a 'U', Undetermined zone at Tsing Lung Tau, resulting in little conflict with the OZP. A small area of this 'U' zone has been earmarked for rezoning to R(B). Future developments on this site may suffer visual impacts from the bridge. Below Castle Peak Road the bridge structure and construction will conflict with the Residential(Group C) zoning of Grand Bay Villa, however, these properties are currently proposed for resumption.

A contractor's compound is proposed to the west of the quarry in a heavily disturbed area of Green Belt. On completion of construction works, the landscape mitigation measures propose that this area be made available as a viewpoint and recreation area for the Tsing Lung Bridge.

Tsing Lung Tau to Siu Lam

From Tsing Lung Tau to Tai Lam Chung the alignment will be in tunnel under the Tai Lam Country Park not causing any conflict.

At Tai Lam Chung Valley the tunnel portal will be constructed above a disused quarry (currently used for open storage) within a G/IC zone, also containing the Tai Lam Correctional Institution, resulting in few conflicts. On the western side of the valley, the Siu Lam cutting is located within an extensive area of Green Belt resulting in few conflicts with planned developments, although it does conflict with the general presumption against development within a Green Belt zone.

Siu Lam to So Kwun Wat

Across the Siu Lam Valley, the alignment runs through Green Belt zones so avoiding conflict with planned development. However, an extensive area of Comprehensive Development Area (CDA) zoning is located to the southern end of the valley. Although this is not in direct conflict with the alignment any future developments may suffer visual impacts from the viaduct.

Across the heavily disturbed ridge between Siu Lam and So Kwun Wat the alignment runs through G/IC before proceeding through an additional area of Green Belt resulting in few conflicts with proposed development. The Siu Lam Link Road, between the main alignment and Tuen Mun Road at Siu Lam, runs through Green Belt and Government, Institutional and Community (G/IC) zones avoiding major conflict with proposed developments.

The So Kwun Wat Link Road generally runs through Green Belt areas below the Tai Lam Country Park avoiding encroachment into the park itself. However, the alignment does encroach on the eastern and northern edges of the 'V', Village type development, zone shown on the Draft So Kwun Wat Outline OZP No. S/TM-SKW/3.

At the western end of the valley the roads runs adjacent to several planned and potential development areas such as Area 56 PSPS (SKW-P2), Area 56 CDA (SKW-P4), Area 56 CDA (SKW-P3) and Area 55 CDA (SKW-P8). There are no direct conflicts with these areas, however, they may suffer visual intrusion from the road. This has been considered within the visual impact assessment.

Conflicts with the OZPs have been discussed with the relevant District Planning Offices. These have been highlighted in the Alignment and the Interchange and Connections Reports. A planning application for Route 10 (NLYLH) under the Planning Ordinance is not necessary as roads are permitted in all zones shown on OZPs. An area has been zoned on the Draft North-East Lantau OZP, No S/1-NEL/5 for the Route 10 (NLYLH) alignment. The alignment will be added to the other OZPs either as a proposed road alignment prior to gazettal under the Roads Ordinance or, after gazettal, the road will be specifically zoned.

11.16 Summary

Much of the land sections of the Route 10 (NLYLH) study area comprises the hillsides of North Lantau and three valleys of Tai Lam Chung, Siu Lam and So Kwun Wat. These are primarily natural hillsides with low levels of disturbance and of a high landscape and visual quality. There are, however, a number of areas which have been disturbed, such as one of the knolls between the Siu Lam and So Kwun Wat valleys and the eastern end of the So Kwun Wat valley. The steeply undulating nature of the study areas results in much of the Route 10 (NLYLH) alignment being either enclosed

within a tunnel, elevated or requiring extensive earthworks or slope cutting. The landscape design for the Southern Section of the Route 10 (NLYLH) is shown in *Annex I* of Volume 2 of this Report.

The alignment does not follow the overall landform of the area, but runs against it. This results in the extensive significant adverse landscape impacts prior to the mitigation measures including impacts to the following:

- LCU 1 Village Areas of Fa Peng and Tso Wan due to loss of coastal context;
- LCU 3 North Lantau Natural Hillside and Coastline due to disturbance to landform and vegetation;
- LCU 4 Disturbed Hillside due to disturbance to landform and vegetation;
- LCU 6 North Lantau Natural Hillside at Kwai Shek due to permanent disturbance to the existing landform;
- LCU 8 Siu Lam Ridge due to the extensive cut across the ridge;
- LCU 9 Siu Lam Valley floor due to the disturbance to tree planting by the viaduct columns;
- LCU 11 Eastern So Kwun Wat Valley due to the level of disturbance to the relatively untouched and rural parts of the valley; and
- LCU 13 Natural Hillside along to So Kwun Wat valley due to the extensive earthworks and loss of vegetation.

With respect to the visual impacts prior to mitigation significant adverse impacts are suffered by the following:

- the local villages at Fa Peng and Tso Wan;
- the East Lantau Planned Reclamation and tourist / recreational development;
- Ma Wan Channel boat traffic;
- Kap Shui Mun boat traffic;
- Ma Wan residents and proposed theme park users;
- residents from Sham Tseng to Hong Kong Garden;
- Tai Lam Chung Tsuen residents;
- Siu Lam Village residents;
- Residential development and planned CDA area at Siu Lam;
- So Kwun Wat Tsuen main and satellite village;
- MacLehose Trail walkers;
- Planned development Areas 48A, 55 and 56; and
- Rural houses along Tuen Mun Road.

The impacts arise from the limited opportunity of integrating the road with the existing natural landform, landscape and visual environment, with which it sharply contrasts.

The concepts for mitigation measures described form the basis for the Landscape Proposal and Preliminary Design. The mitigation measures seek to alleviate the impacts where possible and effort has been made to provide measures which reduce these impacts as far as possible. The mitigation responds to the impacts caused by construction and are considered to result in many of the impacts being less unacceptable in the long term. However, they cannot alleviate all the impacts caused by the introduction of the large scale manmade structures into the landscape.

Landscape impacts are considered to be suffered by the following:

- LCU 1 Village Areas of Fa Peng and Tso Wan due to the permanent loss of coastal context;
- LCU 3 North Lantau Natural Hillside and Coastline due to the permanent disturbance to the existing landform;
- LCU 8 Siu Lam Ridge due to the extensive cut across the natural ridge; and
- LCU 11 So Kwun Wat Valley due to the change in character and level of disturbance to the rural valley.

The visual impacts include:

- the local villages at Fa Peng and Tso Wan;
- East Lantau Planned Reclamation if developed with tourist and recreational facilities;
- Ma Wan Channel boat traffic;
- Ma Wan residents and Theme Park users;
- residents at Hong Kong garden to Sham Tseng, and residents in close proximity to the bridge;
- Tai Lam Chung Tsuen residents;
- Siu Lam Village residents;
- residential development and planned CDA area at Siu Lam;
- So Kwun Wat Tsuen main and satellite village;
- MacLehose Trail walkers;
- Planned development Areas 48A, 55 and 56; and
- rural houses adjacent to Tuen Mun Road.

The mitigation measures, although they do not alleviate the impacts, aim to make them less unacceptable as far as possible.

11.17 Recommendations

A series of recommendations have been formulated to alleviate the landscape and visual impacts caused as far as possible. A summary of these is given below for each of the Construction and Operation Phases.

Construction Phase

- slope cutting is to be minimised to avoid direct impacts to neighbouring areas;
- vegetation, in particular trees and tree groups should be retained as far as possible. A tree survey in accordance with WBTC 24/94 Tree Preservation will be undertaken and submitted for approval by relevant government departments;
- topsoils will be tested for their quality, and if suitable should be stockpiled for later use on this or other projects;
- hoardings will be used adjacent to ground level works areas and contractor compounds as a visual screen.

Operation Phase

- rock slopes will be designed to support at least berm planting at the lower levels

and to consider the upper levels as potential cliff features;

- soil slopes will be cut at gradients capable of supporting new planting;
- shotcrete will be avoided as far as possible and used only when geotechnical constraints dictate;
- all slopes will be designed in consideration of WBTC 25/93 Control of Visual Impact of Slopes;
- all slopes will be cut to integrate with the neighbouring topography, particularly at the interface areas;
- the Tsing Lung Bridge will be designed as a new landmark and feature across the Ma Wan Channel and integrated with the family of bridges comprising the Lantau Link. All designs will be submitted for ACABAS approval;
- viaducts will be designed to minimise impacts as far as possible. Within engineering constraints the viaducts will be constructed using precast launch methods. Viaduct structures will be designed to be of minimal visual intrusion by using a slender profile and minimum of columns. All design will be submitted for ACABAS approval;
- noise barriers, semi-enclosures and full enclosures will be designed to be as least visually intrusive and possible and also designed using a single theme. Clear panels will be predominantly used for all noise mitigation measures to ensure that the barriers/enclosures are not visually dominant elements, particularly on viaducts. They will also be integrally designed with the other engineering structures to avoid visual clutter. All barriers/enclosures will be submitted to ACABAS for approval;
- planting will be widely used on all disturbed areas which do not constitute the permanent engineering works to provide a visual screen and suffer. Planting corridors will be identified separate to utilities and designed with sufficient depth for tree planting. Planting will also be used on all slopes, either as berm planting or on the soft slopes, and as visual screening along the roadside, adjacent to the viaduct columns and on works areas. In general, planting will comprise predominantly nature tree and shrub species with an intention to compensate woodland loss and species disturbed. More ornamental planting will be used adjacent to the administration areas complementing the built form and as visual interest;
- semi cut-off lighting is proposed for all highway lighting to avoid the creation of excessive ambient light, particularly in the rural areas.

11.18 Conclusion

Overall the landscape and visual impact assessment concludes that the proposed Route 10 (NLYLH) alignment is acceptable in accordance with the EIAO TM. However, several individual elements within the project are considered unacceptable locally, particularly relating to the extent of slope cutting. Measures to alleviate these impacts have been described in detail in the foregoing section.

The construction of the Route 10 (NLYLH) alignment will, however, create new features and landmarks across the North Lantau and New Territories area, particularly with respect to the proposed Tsing Lung Bridge between North Lantau and Tsing Lung Tau. This is proposed to be a suspension bridge reflecting the design of the adjacent Tsing Ma Bridge and will add to the family of bridges in this area.