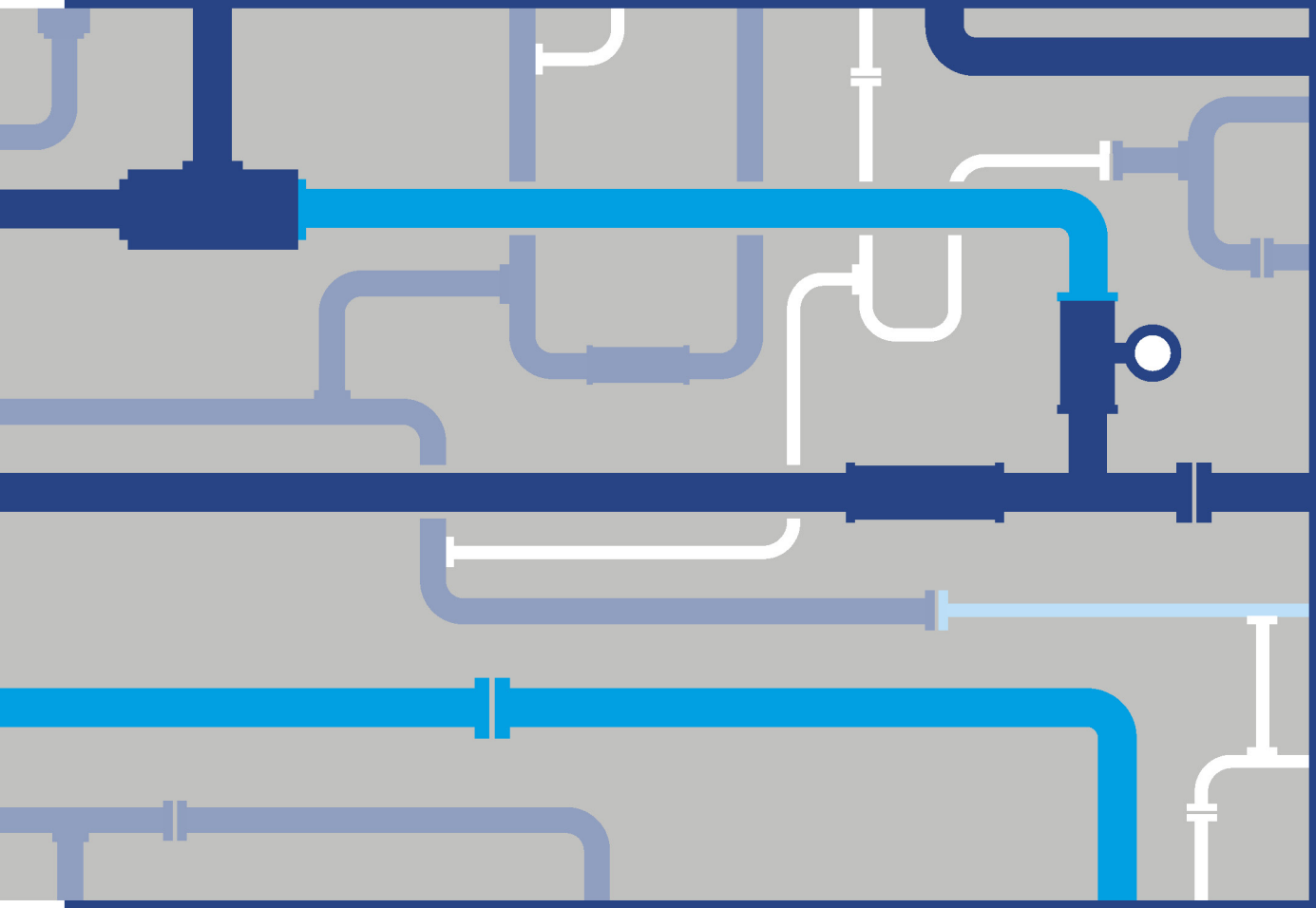
chapter 14

landscape and visual.



Environment Effects Statement | May 2021

western outer ring main

a project of apa

Contents

Chapter 14

14.1 Introduction

This chapter provides an assessment of the landscape and visual impacts associated with the construction and operation of the Western Outer Ring Main (WORM) gas pipeline project (the Project). This chapter is based on the assessment presented in Technical report J *Landscape and visual.*

Understanding the landscape and visual impacts of a Project can inform planning decisions by identifying the effects of proposed infrastructure projects on the quality of existing views and landscape character. A landscape and visual impact assessment (LVIA) is a tool that has been used for the Project, to identify and assess the significance of changes which may have an impact on existing landscape values and amenity.

Changes to landscape character and views may have far-reaching consequences. The LVIA is closely associated with social, natural environment supporting flora/fauna, cultural and heritage aspects which can affect a sense of connection to a landscape. Adverse impacts may also be avoided, minimised or mitigated if dealt with from the outset. In some instances, there may be opportunities to enhance landscape character and amenity.

A LVIA assists to anticipate any adverse effects which may be deemed unacceptable by the community and represent a Project risk.

The EES scoping requirements set out the following evaluation objectives:

- *Minimise potential adverse social, economic, amenity and land use effects at local and regional scales.*

The LVIA for the Project included a review of existing land use types, built form, topography, hydrology and vegetation in the vicinity of the Project to gain an understanding of the conditions in the study area.

Other aspects closely related to the landscape and visual evaluation objective include land use, cultural heritage, social and biodiversity. These are addressed in the following reports:

- Technical report K and Chapter 15 *Land use*
- Technical report I and Chapter 13 *Cultural heritage*
- Technical report L and Chapter 16 *Social*
- Technical report A and Chapter 7 *Biodiversity and habitats.*

14.2 Method

The LVIA involved the following key tasks:

- Review of relevant legislation and policy at a national, state and local level
- Establishment of a study area, defined as one kilometre on either side of the construction corridor, as shown in Figure 14-1 and Figure 14-2. This was determined through a desktop study that examined aerial photographs and topographic maps, where landform and land cover (screening) were considered in tandem. The potential maximum visibility for this type of development was also taken into consideration.
- Desktop assessment and baseline data review including:
  - Relevant Project design information
  - Data sources (such as DELWP, VicPlan and Geoscience Australia)
  - Publicly available information of other similar developments within Victoria.
- Site inspection to gain representative views of the Project from publicly accessible viewpoints, assess the landscape character of the study area and identify landscape sensitivities and sensitive visual receptor locations
- Characterisation of the existing conditions in terms of land use, built form, historical features, topography, hydrology and vegetation
- A risk-based review of potential impacts to prioritise the focus of the impact assessment
- Assessment of the potential landscape and visual impacts during construction and operation of the Project, which included:
  - A landscape impact assessment based on six landscape character areas (LCAs):
    - LCA1 – Creek corridor
    - LCA2 – Extractive industry
    - LCA3 – Flat to gently undulating farmland
    - LCA4 – Residential
    - LCA5 – Semi rural residential
    - LCA6 – Land subject to development.

    The LCAs are shown in Figure 14-1 to Figure 14-3. The significance of the impacts within each landscape character area during both construction and operation were assessed considering the landscape sensitivity to change and the magnitude of effects to the landscape.
    The magnitude of the landscape effects was based on the size or scale of change, the geographical extent of effects, and duration or reversibility of effects.

What is a landscape character area?

A landscape character area is based on landscape character types identified during the assessment that share the same homogenous environmental or cultural qualities or pattern such as topography, vegetation, hydrology, land use and settlement, built form scale and character, cultural and recreational characteristics.

- A visual impact assessment of the effects of change and development on the views available to people and their visual amenity. Viewpoints were selected based on their proximity to the Project or areas where there is particular interest in the view such as major road and creek crossings, residential interfaces and areas of potential vegetation clearance. The assessment of both construction and operation impacts considered the sensitivity of the viewpoint to change, the magnitude of the change that is likely to occur and the duration of the impact when assessing the significance of the impacts. The viewpoints are shown in Figure 14-3.

  The method for both landscape and visual impact assessment was applied to both construction and operation phase with landscape and visual impacts during construction considered to be of temporary duration, with impacts lasting one year or less. The duration and limited landscape and visual change from construction activities resulted in the study primarily focusing on operation phase impacts.

  Landscape and visual impacts due to vegetation clearance were considered as part of the operation impact assessment. The duration of impacts during operation ranged from those considered short term (impacts lasting one to five years) to permanent (impacts lasting over 25 years).

  Lighting from night-time construction activity was assessed through review of Horizontal Directional Drilling (HDD) locations and duration at these locations, review of aerial imagery and distance to sensitive visual receptors, consideration of background lighting from existing activities, and qualitative assessment of impact on sensitive visual receptors.

  The assessment criteria for both the landscape and visual impact assessments were derived from *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition* (Landscape Institute and Institute of Environmental Management & Assessment, 2013).

What is a sensitive visual receptor?

A sensitive receptor includes individuals and/or defined groups of people who have the potential to be affected by visual change as a result of a project.

- Cumulative impact assessment of existing, planned and approved infrastructure and utility projects within the Project study area.
- Development of environmental management measures (EMMs) in response to the impact assessment through qualitative review and refinement of avoidance and minimisation measures to reduce key impacts identified in the assessment. Refer to Chapter 19 *Environmental management framework* for the full list of EMMs and Section 12 of Technical report J *Landscape and visual*.
- Assessment of the residual impacts of the Project assuming implementation of the environmental management measures.
- Specifying the monitoring required to evaluate whether the Project meets the environmental management measures and detailing contingency measures as required.

Figure 14-1 Landscape and visual study area and landscape character areas (Part 1)

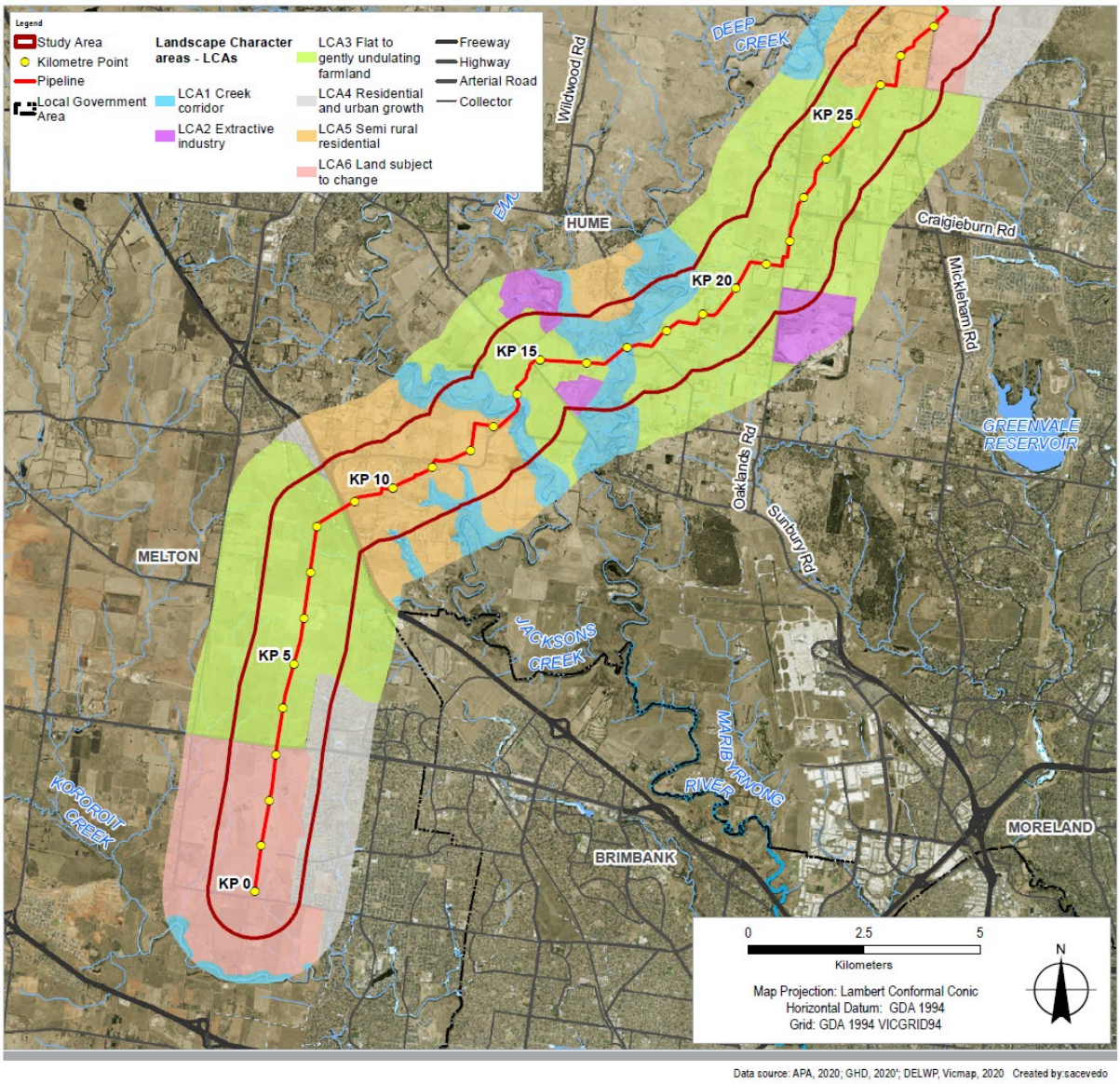


Figure 14-2 Landscape and visual study area and landscape character areas (Part 2)

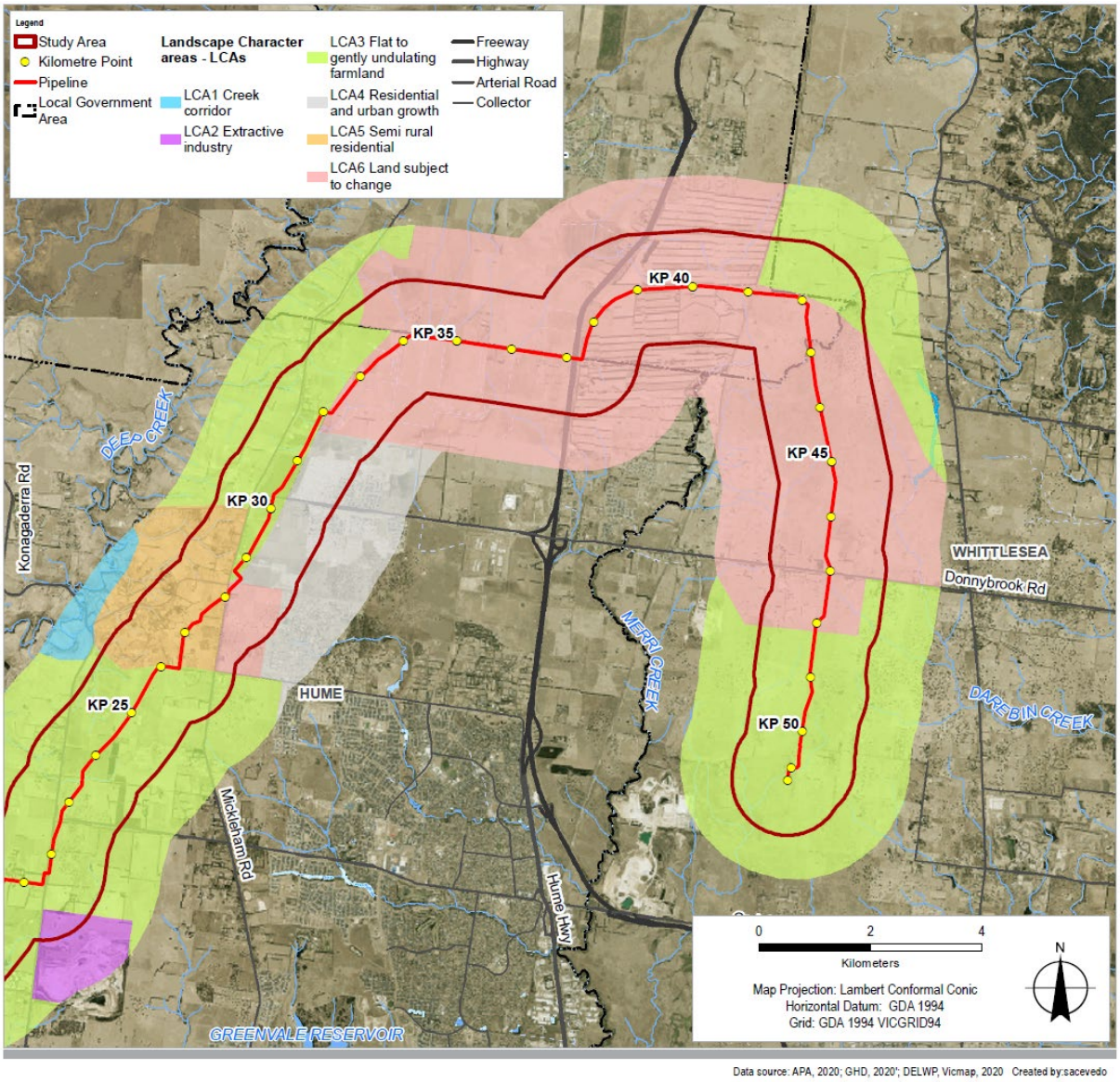
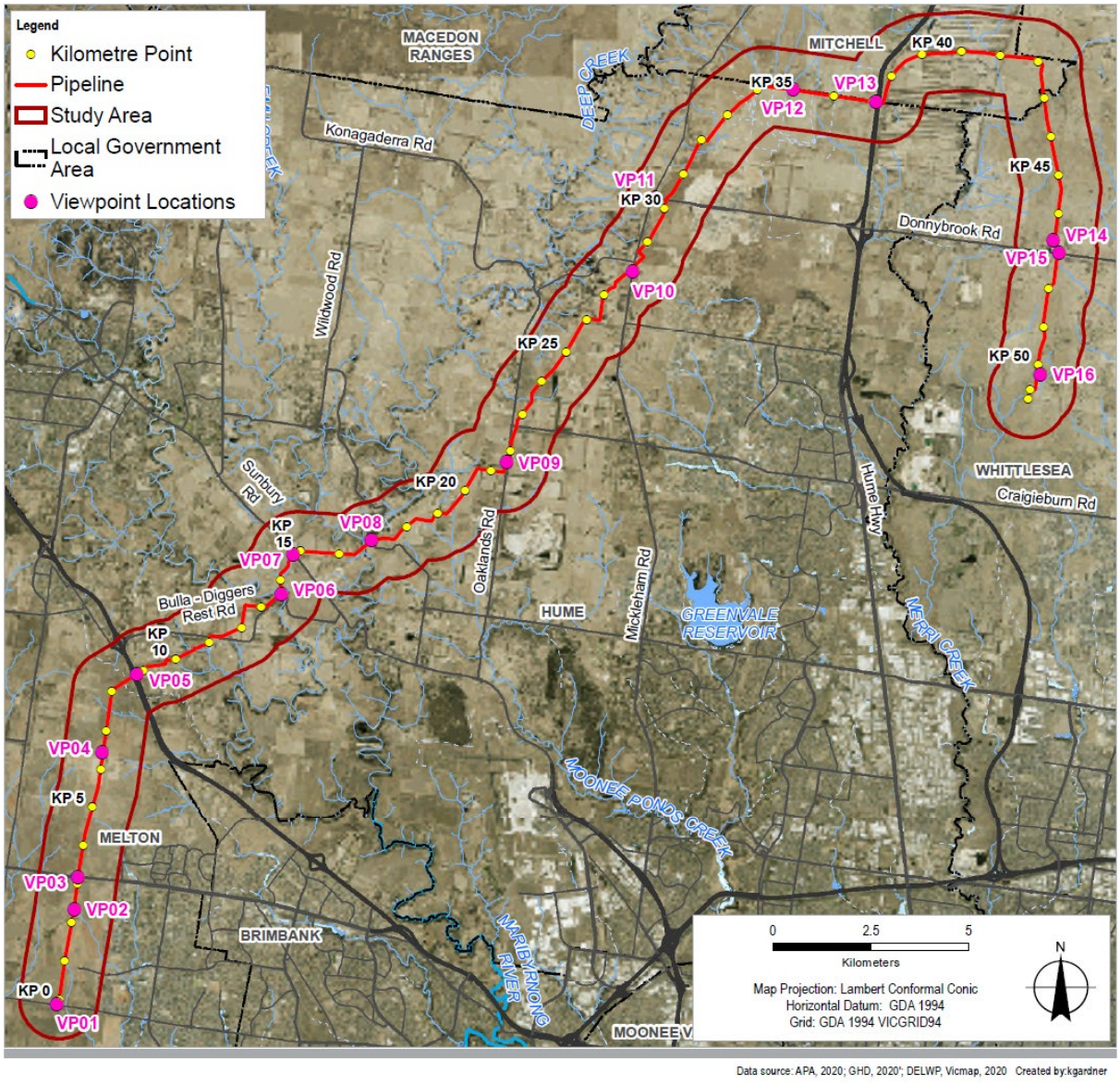


Figure 14-3 Viewpoint locations



14.3 Existing conditions

The following section outlines the existing conditions of the Project study area in relation to the broad landscape and visual features identified within the study area and describes each of the six different landscape character areas. The existing landscape and visual environment was assessed in terms of land use and built form, topography and hydrology and vegetation.

14.3.1 Land use and built form

Between Kilometre Point (KP) 5 – KP 25 and KP 35 – KP 40, the existing land uses within and adjacent to the study area are predominantly rural, characterised by pastoral or grazing properties for livestock production. The proposed pipeline alignment also traverses a number of growth areas within the urban growth boundary (UGB) that are experiencing rapid development such as the suburbs of Fraser Rise in Melton (KP 0) and Merrifield in the City of Hume (KP 30). Melbourne Airport is also located less than 10 km from the study area.

What is an urban growth boundary?

The urban growth boundary is a legislated boundary which acts as the interface between growth areas and metropolitan Melbourne, and a green wedge or rural area.

There are a number of reserves present within or adjacent to the study area such as the Mount Ridley Nature Conservation reserve (2.5 km from the study area) and the Craigieburn Grassland Reserve (3 km from the study area).

Built form within the study area is generally characterised by single storey rural residences with farm amenity buildings in rural residential areas. Within towns there are typical detached, suburban residential dwellings with some historical architecture in Donnybrook and historical dry stone walls in Melton and Hume. The Aboriginal and Cultural Heritage report identified that there was one stone wall within the construction corridor (near KP 3), but upon further inspection it was found to be in poor repair, did not have heritage value and it was not heritage listed. Refer to Technical Report I *Aboriginal and cultural heritage*. Major highways and freeways include the Hume Freeway at the northern end of the alignment, Calder Highway at the southern section of the alignment and the Western Freeway to the south of the study area. The Bendigo line and the North-Eastern line are the only rail lines within the study area.

14.3.2 Topography and hydrology

The topography within the study area generally comprises open flat plains interspersed with volcanic hills. Adjacent to the proposed pipeline alignment are a number of significant topographical features such as Mount Ridley which is approximately five kilometres east of KP 26 (south of Donnybrook Road), as well as Mount Kororoit in Melton (five kilometres to the west of KP 8). The lowest point within the vicinity of the Project alignment is to the south near Taylors Road in Melton and towards KP 15 near Deep Creek.

The study area has multiple waterways and wetlands and numerous smaller connecting tributaries. The three main creeks that run adjacent to and through the Project alignment are Jacksons Creek, Deep Creek and Merri Creek. All three creeks drain towards Port Phillip Bay.

14.3.3 Vegetation

Vegetation within the study area mainly comprises the following:

- Dry grasslands and pasture with scattered groups of established native trees associated with grazing land. There are also scattered native trees such as river red gums occurring as isolated specimens within private property
- Established native trees along creek corridors
- Roadside vegetation in dense groups comprising mainly established native tree species in some areas
- Wind breaks along property boundaries and around paddocks. These mainly comprise established native and exotic tree species
- Scattered native trees.

The following bioregions and sub bioregions are present within the study area:

- Central Victorian uplands
  - EVC 175: Lower Slopes or Hills Woodlands, Grassy
- Victorian Volcanic Plain
  - EVC 132: Plain Grasslands, Chenopod Shrublands
  - EVC 55: Plains Woodlands or Forests, Freely-draining
  - EVC 125: Wetlands, Freshwater
  - EVC 937: Riparian Scrubs or Swampy Scrubs and Woodlands.

14.3.4 Landscape Character Areas

LCAs were defined to establish the existing landscape character around the Project and to provide a framework for assessing the impact of the Project on the landscape. The LCAs described below identify areas that share the same homogenous environmental or cultural qualities or pattern such as topography, vegetation, hydrology, land use and settlement, built form scale and character, cultural and recreational characteristics.

LCA1 – Creek corridor

LCA1 is located primarily between KP 13 and KP 17 as shown in Figure 14-1. This section lies approximately 2.5 km to the north-west of the township of Bulla and comprises a quiet, dynamic landscape with a rural character. Typical features include open paddocks and widely distributed residential dwellings and farm buildings. Wooden and wire fences are in keeping with a rural setting. Jacksons Creek and Deep Creek are typically located within a deep gorge surrounded by steeply sloping hills. Land uses in this section typically include agriculture and broad scale grazing.
Merri Creek is located on private land between KP 42 and KP 43. LCA1 comprises Deep Creek, Jacksons Creek and Merri Creek and has been assessed as a whole unit.

Jacksons Creek and Merri Creek are proposed to be crossed using open trench construction methods. The width of the construction corridor at these crossings has been reduced from 30 metres to 20 metres (Jacksons Creek) and 25 metres wide (Merri Creek). The habitat on one side of the bank at Jacksons Creek is pasture grasses, cattle grazed and pugged all the way to the water's edge. The other bank is very steep and has been fenced to exclude cattle. Very little habitat in the form of either emergent or bank aquatic vegetation is present.

The use of trenchless construction techniques, such as HDD were considered for the Jacksons Creek and Merri Creek crossings to avoid construction disturbance within these areas. The assessment outcome found that crossing Jacksons Creek and Merri Creek using open trench construction techniques was preferred, the rationale for which is detailed within the Surface Water Technical Report (Technical report B) and EES Chapter 3 *Project Development*.

The riparian woodland vegetation of the banks and channel is dense along Merri Creek, with a healthy mix of deep-rooted trees and ground cover vegetation along the waterway, which provides protection of both sides of the waterway. The biodiversity assessment recorded native shrub and tree species (*Tea tree Leptospermum species* and *Eucalyptus species*) flanking Merri Creek in the vicinity of the proposed waterway crossing. Deep Creek would be constructed using HDD and this would require an entry and exit pit as well as set up areas.

Figure 14-4 View south along Jacksons Creek from adjacent to Bulla-Diggers Rest Road

LCA2 – Extractive industry

LCA2 extractive industry is located in the vicinity of KP 15 and KP 16. These areas comprise Sunbury Eco Park, which is a waste management facility and Bulla Tip and Quarry. Both are located on the northern side of Sunbury Road, Bulla. There is also an area of extractive industry to the south of KP 22, on the eastern side of Oaklands Road. Extractive industry is characterised by a high degree of modification to the landscape, typically resulting in a degraded landscape character. This highly utilitarian landscape is generally not open for public access.

Figure 14-5 View south-east towards Bulla Tip and Quarry from Batey Court

LCA3 – Flat to gently undulating farmland

LCA3 is the most commonly occurring and widely distributed LCA within the study area. It is typically a highly modified landscape which has undergone a process of continuous change since European settlement. The landscape has a rural character with open paddocks, small gentle hills with stony rises / knolls and wide distribution of residential dwellings and farm buildings. Gravel roads and wire fences are in keeping with the rural character. The townships of Bulla, Donnybrook and Mickleham are local cultural centres.

Vegetation coverage is generally limited to linear rows of trees along property boundaries or in isolated groups. Other features that characterise this LCA are fence lines, private access roads and the occasional dwelling.

Figure 14-6 View north across flat to gently undulating farmland

LCA4 – Residential and urban growth

LCA4 describes the current residential and urban growth either built or occurring and is located primarily at the south-western sections of the alignment, within proximity to KP 0 and the suburbs of Taylors Hill and Hillside. Residential areas are also located near the northern sections of the alignment, between KP 32 and 47, where the suburbs of Mickleham and Donnybrook are located. Residential areas are expanding and transforming farmland into a built-up urban environment, at a rapid rate in some locations. This section will see significant growth and change over time with large parcels of land either side of the alignment planned for residential growth. Dwellings within residential areas are typified by standard, detached single or multi-storey homes, often built close to the property boundary as shown in Figure 14-7.

Figure 14-7 View south-west of dwellings along Inkerman Crescent, Mickleham

LCA5 – Semi-rural residential

LCA5 describes current semi-rural residential areas located towards the south-western section of the Project alignment, between KP 9 and KP 13. There is also a section between KP 26 and KP 28. This LCA is characterised by a quiet, rural community with open plains surrounded by low hills, some areas with stony rises / knolls and established forests, low density residential houses, small community areas, farm buildings and unsealed dirt roads. The Calder Highway also runs through this LCA to the south between KP 8 and 9. The area is valued for scenic amenity, has a number of locally important features, and generally makes a positive contribution to landscape character. However, there are numerous examples of modifications to the landscape that are similar in character to the Project.

Figure 14-8 View east of a dwelling on Duncans Lane, Diggers Rest

LCA6 – Land subject to change

LCA6 describes areas identified in the PSP as future urban growth and is located primarily at the south-western and northern sections of the Project alignment. This LCA is characterised by open rural plains surrounded by low hills, established forests, some areas with stony rises / knolls and some small sections of drystone walls. The Hume Freeway also cuts through the centre of this LCA. It is evident with the current amount of construction throughout the LCA that the current landscape characteristics are likely to change.

Figure 14-9 View west towards residential area undergoing construction from Donnybrook Road

14.4 Risk assessment

The risk assessment identified the risks associated with landscape and visual impacts as a result of the Project's construction and operation in accordance with the method described in Chapter 5 *Evaluation and assessment framework*.

The initial risk assessment identified five risks; three were associated with the construction phase of the Project and two with the operation phase. The initial risk ratings were medium for Risk ID LV1 and low for the four other risks as outlined below. Additional management/mitigation measures to treat risks were introduced for risks with an initial risk rating of medium as shown in Table 14-1. All risks identified throughout the landscape and visual impact assessment were assessed as having a low residual risk rating.

Risk ID LV1 describes potential landscape character and visual impacts from tree removal or alterations to public space as a result of the construction of the Project. The initial mitigation measures propose an arborist report on any trees to be retained prior to construction as well as maintaining visual vegetation buffers between roads and construction areas where practicable. With the proposed initial mitigation measures, it is expected that a moderate degree of visual change would occur occasionally along the Project alignment, therefore the initial risk rating has been assigned a medium rating. The additional mitigation and management measure for this risk involves a planting and remediation plan, which will outline a monitoring and defects period for planting and remediation. With EMM LV7 this will result in a residual risk rating of low.

Risk ID LV2 relates to the landscape character, private and public visual impacts as a result of the construction activities proposed for the Project including laydown areas, activity in construction footprint and equipment use changes. The construction corridor will be kept tidy and dust kept to a minimum. The initial mitigation measures state that machinery, materials and temporary infrastructure would be removed as soon as no longer required. These initial measures have resulted in the initial and residual risk rating assigned as low. The degree of visual change would occur occasionally along the Project alignment and the impacts have the potential to be mitigated.

Risk ID LV3 identifies the landscape and visual impacts associated with lighting required to undertake construction activities at night. These sites will be lit for approximately one and a half weeks during the construction phase. Lighting will be required at Deep Creek, major roads and rail crossings during HDD activities. The ambient lighting at Deep Creek will be lower than that along major roads and freeways, however, from a review of aerial imagery, the closest residential dwelling to the HDD site is approximately 350 metres away. Given this distance and the temporary nature the impact is expected to be low. Initial mitigation measures will require lighting to be managed in accordance with the requirements in Australian Standard AS/NZ 4282.2019 Control of the obtrusive effects of outdoor lighting. It is expected that a low degree of visual change would occur occasionally along the Project alignment with the application of the initial mitigation measures, resulting in a low initial and residual risk rating.

Risk ID LV4 describes the impacts on landscape character due to the operation of the permanent infrastructure for the Project, with the most significant permanent infrastructure being the mainline valves. Initial mitigation measures will aim to screen these appropriately through planting of trees and shrubs if requested by affected landholders and while meeting requirements of the Asset Protection Zone (APZ)1. Following the initial mitigation measures, it is expected that a low degree of visual change would occur occasionally along the Project alignment. As a result, the initial and residual risk rating would be low.

Risk ID LV5 relates to restrictions on the use of the easement area for tree planting and other landscape and visual enhancements that impact on landscape character. The initial mitigation measures propose replacement of screening trees and shrubs where reasonably requested and in consultation with affected landholder and/or responsible authority. While the easement area may not be landscaped, visual enhancements may be undertaken nearby. It is expected that a low degree of visual change would occur occasionally along the Project alignment, therefore the initial risk rating and residual would be low.

A summary of the risk assessment results for landscape and visual impacts is presented in Table 14-1. Table 14-4 identifies the EMMs proposed to address landscape and visual impacts.

[1] An Asset Protection Zone (APZ) is an area around the MLV asset to be maintained to minimise potential impact from bushfire. An APZ can have some planted vegetation within it.

Table 14-1 Risk assessment

Risk ID	Works area	Risk pathway	Initial mitigation measures	Initial risk rating	Additional mitigation measures	Residual risk rating
Construction and operation						
LV1	All	**Tree removal:** Removal or alterations to trees and vegetation buffers changing the landscape character and causing visual impacts.	LV1 – Tree removal avoided where possible. LV2 – Arborist report on trees to be retained. LV5 – Replacement of screening or public trees where practicable.	Medium	LV7 – Planting and remediation plan.	Low
Construction						
LV2	All	**Construction activities:** Construction activities including laydown areas, activity in construction corridor and plant/equipment use changing landscape character and causing private and public visual impacts.	LV3 – Construction works removed as soon as practicable.	Low	No additional measure identified.	Low
LV3	All	**Lighting:** Lighting required during any night-time works at major creeks, major roads or rail crossings during HDD activities, causing visual amenity impact on nearby sensitive receptors.	LV4 – Light managed in general accordance with the requirements in Australian Standard AS/NZS 4282:2019 and to minimise off-site light spill.	Low	No additional measure identified.	Low
Operation						
LV4	All	**Permanent infrastructure:** Changes to the landscape character due to presence of the permanent infrastructure.	LV6 – Trees and shrubs will be introduced to screen the mainline valve from roads and residences, if reasonably requested by affected landholders (while meeting requirements of the APZ).	Low	LV7 – Planting and remediation plan.	Low
LV5	All	**Restrictions on land use in the pipeline easement:** Restrictions on use of the easement area for tree planting and other landscape and visual enhancements impacting on landscape character.	LV5 – Replacement of screening or public trees where practicable.	Low	LV7 – Planting and remediation plan.	Low

14.5 Construction impact assessment

This section presents a discussion of the construction impacts associated with the Project in relation to both landscape and visual impact assessments. This relates to Risk ID LV2 and Risk ID LV3. Environmental management measures are discussed as they relate to these landscape and visual impacts. Refer to Chapter 19 *Environmental management framework* for the full list of environmental management measures and Section 12 of Technical report J *Landscape and visual.*

Discussion regarding vegetation clearance to undertake the Project (Risk ID LV1) is provided in Section 14.6.4 as it will have an impact through the operation phase.

14.5.1 Construction activities

Construction activities would occur along the entire alignment and may be visible to varying degrees by people living, working, and travelling through the surrounding rural and residential areas, particularly residents and workers within close proximity to the Project (Risk ID LV2).

Landscape and visual impacts are likely to be generated by the following:

- Work crews and construction plant/machinery/lighting
- Temporary construction compounds/site offices
- Potential views to the cleared construction corridor
- Potential views to temporary storage areas where pipe and materials are stockpiled within the construction corridor
- Potential views of delivery activities associated with construction equipment, pipe and materials. This is likely to include large scale machinery and materials associated with transportation of the pipeline components
- Potential views of construction traffic and workers.

Machinery, materials and temporary infrastructure would be removed as soon as it is no longer required and construction laydown areas would be kept tidy and dust kept to a minimum (EMM LV3).

A substantial portion of the proposed pipeline alignment is located within areas undergoing rapid residential development (KP 0 – KP 3.2 and KP 28.2 – 50.8), where construction activity would already be a common occurrence (refer to LCA4 in Section 14.3.4). Additionally, machinery and construction is sometimes observed in rural areas in relation to farming activities, while construction activity commonly occurs along major roads and highways as part of road upgrade and maintenance works.

All construction activity would be temporary in nature and is expected to be completed within less than one year. Construction work crews and construction activities would move concurrently along the Project alignment, therefore views of construction activities from a specific location would not last the entire construction period of the Project.

14.5.2 Lighting

Where the pipeline is proposed to be constructed using HDD, there would be night-time lighting from 24-hour construction activities (Risk ID LV3). The following roads and watercourses are proposed to be crossed using HDD:

- Melton Highway (visible from VP03)
- Calder Freeway (VP05)
- Sunbury Road (VP07)
- Hume Freeway (VP13)
- Deep Creek (VP08).

These sites would be lit for approximately one and a half weeks during the construction phase and the extent of light spill to areas where it is not required is expected to be minimal. There would be no night-time lighting from construction of the Project where it is directly adjacent to residential areas elsewhere along the Project alignment. Lighting from night-time construction activities would also occur at hydro testing sites. However, this is expected to be limited in duration as compared to the HDD sites and only required if work is necessary outside of daylight hours.

Night-time works and associated lighting are a common occurrence along major roads and freeways, particularly in built up and growing urban environments. Street lighting also contributes substantially to background ambient lighting levels in these major road environments. With existing lighting sources and the distance of the HDD locations from residences, the lighting impacts at the HDD locations would be minimal.

Light generated during night construction activities would be designed to minimise off-site light spill and managed in accordance with the requirements of Australian Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting (EMM LV4).

14.5.3 Construction residual impact summary

With the implementation of mitigation measures, residual impacts on landscape and visual amenity during construction are:

- Public and private visual impacts and changes to the existing landscape character from construction activities are low to negligible. Views of construction activity from a specific location would be temporary and a significant portion of the study area is experiencing rapid development of residential areas where construction activity is a common occurrence. Machinery and construction is also sometimes observed in relation to farming activity within rural areas. In addition, construction activity commonly occurs along major roads and highways as part of road upgrade and maintenance works. All construction activity would be temporary in nature (less than one year)
- Lighting impacts from night-time construction activities at the HDD sites where the Project alignment crosses Calder Freeway, Sunbury Road, Deep Creek and Hume Freeway. Due to the closest residential dwelling to a HDD site being approximately 350 metres away, the temporary nature of these works (less than two weeks) and background lighting due to local infrastructure, the residual impact is low. Lighting would be required to be managed in accordance with Australian Standard AS/NZ 4282.2019 *Control of the obtrusive effects of outdoor lighting.*

14.6 Operation impact assessment

This section presents a discussion of the operational impacts associated with the Project in relation to Risk ID LV4 and Risk ID LV5 (sections 14.6.1 to 14.6.3) and Risk ID LV1 (Section 14.6.4).
The following sections set out the findings of the landscape assessment (through the LCAs described in Section 14.3.4) and the visual assessment (through the viewpoints shown in Figure 14-3) of the key Project elements for the operation phase. EMMs are discussed as they relate to these landscape and visual impacts. Refer to Chapter 19 *Environmental management framework* for the full list of environmental management measures and Section 12 of Technical report J *Landscape and visual.*

14.6.1 Pipeline

Once constructed, the pipeline would be underground and would not have an impact on the landscape character or viewpoints within the study area during the operation phase of the Project.

A number of upstand test-points would be required to be installed for the pipeline above ground. These test points consist of small pole mounted enclosures housing the Impressed Current Cathodic Protection (ICCP) system monitoring equipment. Test-points are typically installed at marker posts and other key features such as public roads and fence crossings. One location is proposed along the alignment near MLV2.

What is an ICCP system?

An Impressed Current Cathodic Protection (ICCP) system is a form of protection against corrosion, which uses an external source (anode) to apply an electrical current through the environment and on to the pipe.

Additionally, pipeline markers would be installed along the length of the pipeline to indicate the pipeline location in accordance with Australian Standard AS2885 Pipelines – Gas and liquid petroleum and APA standards. An example of a pipeline marker is provided in Figure 14-10. The introduction of pipeline marker signage is not uncharacteristic within the existing landscape due the existing infrastructure and signage throughout the study area.

Figure 14-10 Example of a pipeline marker

Source: APA, Living near a gas transmission pipeline, 2020

Once constructed, where possible, it is APA's preferred position that the Project's pipeline easement is designed to be linear green spaces that ultimately become council public reserves and open spaces. APA's *Site Planning and Landscape National Guidelines* (APA, 2020) outline the preferred urban design and landscape outcomes for APA's easements. In general, these guidelines are designed to enhance social outcomes and visual amenity by providing for landscaped active open space areas that typically incorporate a mix of landscaping and shared use paths, examples of which are shown in Figure 14-11. APA would work with local councils to build awareness of the Landscaping Guidelines and seek that developers be encouraged to landscape, as per the requirements of the Landscaping Guidelines, within APA easements. As much of the land on which the pipeline is to be constructed is private land, it would ultimately be the decision of the owner of the property on which the pipeline is constructed to progress the establishment of linear green spaces within the easement, in-line with APA's *Site Planning and Landscape National Guidelines*.

Figure 14-11 Potential linear open space outcomes (Source: APA, 2020 – Site Planning and Landscape National Guidelines)

Precedent image

Landscaped areas with sculptures

Precedent image

Potential for long view lines and long green corridors

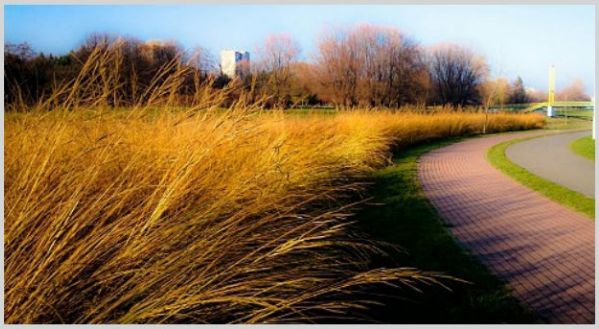
Precedent image

Easement corridors with landscape treatment combined with reserves

Precedent image

Potential to expand and connect shared path network

Precedent image



Expansive grass and low planting areas

APA's guidelines provide for:

- Excavations considered within the 3 metre buffer area, like pedestrian and cycle paths and roads crossing perpendicular to the pipeline alignment
- Excavation works within the easement require APA approval and site supervision by an APA officer
- Landscape furniture like seats and picnic tables can be installed on the easement subject to approval by APA
- Significant larger landscape structures such as small shelters or pergolas and fitness equipment could be installed on the easements, outside of the 3 m buffer area, subject to APA assessment on a case by case basis.

14.6.2 Mainline valves

There are three above ground mainline valves (MLVs) proposed to be constructed at KP 6 (located at VP04), KP 22 (VP09) and KP 35 (VP12) along the pipeline alignment. A MLV is a set of buried and aboveground piping, valves and equipment, in a fenced off compound as described in Chapter 4 *Project description*. The MLVs would be finished with hardstand areas and chain mesh fencing with barbed wire screen at the top of the fencing to exclude members of the public. APA's security fence design for MLV sites has been developed to deter unauthorised access while maintaining a low visual amenity impact across a broad range of environments that APA pipelines traverse. The design would see the barbed wire installed vertically straight and situated 3 metres above ground level to ensure that only intruders would be affected by the barbs, and that it is safe for the public and animals to pass by the fence. A permanent access point would be established for each MLV for access for APA operations staff from an adjacent road. There would be no lighting at the MLVs.

All MLVs would be located within flat to gently undulating land (LCA3). APA intends to submit a subdivision application for each of the three MLV sites and acquire these for the Project.

MLV1 would be located near KP 6 and would be fenced with gates to provide ongoing access from Holden Road. The MLV1 facility would be co-located with the existing Sunbury Pipeline facility incorporated within a new compound approximately 20 metres by 15 metres. The visual impact to VP04 was assessed as a low change to the existing gas pipeline facility. A photomontage illustrating the anticipated changes to the existing view is provided in Figure 14-12.

MLV2 would be located near KP 22 and would be fenced with chain wire fencing with gates to provide ongoing access from Oaklands Road. For the most part, MLV2 is likely to be hidden from view given the existing roadside vegetation at the site, however, there would be filtered views of the chain wire fencing and structures associated with the proposed facility. Both the magnitude and the sensitivity to change at VP09 were assessed as moderate due to the discernible change to the existing view (from the removal of vegetation) and the presence of neighbouring residential properties who may have long viewing periods at a distance across Oaklands Road. However, the mainline valve would be partially screened by established roadside vegetation and there would also be an opportunity to introduce screening vegetation around the mainline valve site to further reduce impacts. A photomontage illustrating the anticipated changes to the existing view is provided in Figure 14-13.

MLV3 was assessed to have the highest visual impact of the three MLVs. This is due to the location being adjacent to the road on gently undulating farmland (refer to LCA3 in Section 14.3.4). MLV3 would be situated near KP 35 and would be fenced with gates opening to Gunns Gully Road. It would be contained in a chain wire fenced compound of approximately 12 metres by 12 metres. There is currently no infrastructure in this area similar in character to the proposed MLV. MLV3 would represent a discernible change to VP12, however, it has the potential to be mitigated with the application of planting (while meeting requirements of the APZ). A photomontage illustrating the anticipated changes to the existing view is provided in Figure 14-14.

Trees and shrubs would be introduced (while meeting the APZ requirements) to screen MLVs from roads and residences, if reasonably requested by affected landholders and with any necessary approvals granted. The planting of trees and shrubs will be undertaken in consultation with the affected landholder and/or responsible authority (EMM LV5 and LV6).

Figure 14-12 Photomontage: predicted view of MLV1 at Holden Road (located at VP04)

Figure 14-13 Photomontage: predicted view of MLV2 at Oaklands Road (located at VP09)

Figure 14-14 Photomontage: predicted view of MLV3 at Gunns Gully Road (located at VP12)

14.6.3 Wollert Compressor Station upgrade

The following works are proposed at APA's existing gas compression station located at 365 Summerhill Road:

- A new Solar – Centaur 50 gas turbine driven compressor unit, along with associated valves, pipework and equipment, would be installed within the existing Wollert compressor station. It currently contains two existing Solar – Centaur 50 and three existing Solar – Saturn 10 gas turbine driven compressor units
- A new end of line scraper station is required at the Wollert end of the pipeline and would be located within the existing APA facility at Wollert
- A new regulating station to enable the flow of gas from the (proposed) high pressure WORM pipeline to the (existing) Pakenham-Wollert pipeline, which is designed for a lower operating pressure.

The Wollert compressor station upgrades would be contained within a fenced area to exclude members of the public.

Figure 14-15 shows the view from VP16 looking towards the existing Wollert Compressor station, which is located within flat to gently undulating land (LCA3). It is anticipated that the proposed upgrades to the Wollert Compressor Station will present a minimal change to this view and are not likely to be obvious from public viewpoints. This is due to the changes being co-located with the existing infrastructure and its distance from the road. It is also noted that the current facility is 700 metres from the nearest residential dwelling and this distance will result in negligible visual impact.

Figure 14-15 Wollert Compressor Station from Summerhill Road (located at VP16)

Source: GHD, 2020

14.6.4 Vegetation clearance and planting

The pipeline alignment for the Project has been selected to minimise clearing of vegetation where possible. Vegetation clearance in the construction corridor may alter the landscape character in some areas. The highest landscape character impacts were found to occur on LCA1 – Creek corridor and LCA5 – Semi-rural residential, where an overall moderate significance of impact rating was assigned (pre-mitigation). This is due to the potential for vegetation clearance altering the character of the landscape in sensitive areas (such as creek corridors). The landscape and visual amenity impacts associated with stony knolls and drystone walls has been considered in the broader landscape context from publicly accessible viewpoints.

Construction at Jacksons Creek is likely to require the removal of one large native tree (as shown in Figure 12.8 within Appendix HH of Technical Report A Biodiversity). However, as demonstrated in the native tree mapping within Appendix HH of Technical Report A *Biodiversity,* there are several large and small trees that would be retained adjacent to the construction corridor. When viewed from VP06 (Bulla-Diggers Rest Road), the loss of vegetation is considered to have a minor impact on the landscape character and would not be uncharacteristic of the creekline environment, whereby there are already numerous gaps in vegetation cover.

At the Merri Creek crossing, two large native trees and one small native tree are likely to require removal (as shown in Figure 12.23 within Appendix HH of Technical Report A Biodiversity). At this crossing a number of large and small trees would be retained adjacent to the construction corridor. Merri Creek is located on private land and therefore did not feature in the visual analysis that focussed on publicly accessible viewpoints.

Vegetation clearance may also alter the character of LCA3 – Flat to gently undulating farmland and LCA4 – Residential and urban growth, however, this would be to a lesser extent. This is due to existing development which has already modified the landscape and vegetation clearing would not be uncharacteristic with other existing easements, roads and transmission lines that cut through LCA3. For these reasons, a rating of moderate-low was assigned to these LCAs.

A rating of low to negligible was assigned to LCA2 – Extractive industry and LCA6 – Land subject to development as these landscapes are either highly degraded or experiencing a process of rapid change. Any changes to the landscape character brought about by the Project would therefore not be significant.

The highest rating for visual impact was moderate for three road crossings, Gunns Gully Road (VP12), Oaklands Road (VP09) and Mickleham Road (VP10). At these locations, there is potential for vegetation removal or alterations which may result in a visual change to the landscape. However, the change is unlikely to be significant and the visual impact at these locations was assessed as moderate (pre-mitigation).

Prior to construction, an arborist report would be undertaken on any trees to be retained within or immediately bordering the construction corridor (where required) in accordance with *AS-4970 Protection of trees on development sites*.

Tree removal during construction would be avoided where possible. The assessment considers any potential impacts on trees from proposed construction activities in accordance with AS-4970 Protection of trees on development sites. Trees that provide screening to private property residences to be retained would be clearly demarcated prior to commencement of construction (EMM LV1). Additionally, an arborist report would be undertaken on trees that screen private residences from road reserves to be retained within or immediately bordering the construction corridor where trimming would be required (EMM LV2).

Where there is any loss of screening trees and shrubs between a residence and a road reserve and shrubs within the approved construction corridor, these would be replaced with appropriately selected trees where reasonably requested and in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance of the relevant bushfire management overlays for the area (EMM LV5).

Implementation of a planting and remediation plan (EMM LV7) would provide for recording and monitoring appropriate reinstatement and replacement planting to be undertaken in accordance with the environmental management measures.

Following the successful implementation of these mitigation measures, the significance of residual impacts of the Project on LCA1 and LCA5 would be low.

Good visual outcomes can be achieved within the easements with a well-planned planting design. Road reserves outside the Project's pipeline easement can benefit from extended visual integration with green views. Grass, small shrubs and groundcovers are permitted within APA easements. Small trees and large shrubs might be permitted by APA within the easement key considerations:

- For the purpose of pipeline accessibility, medium/small trees and large shrubs must be installed outside the 3 metre buffer area

- Proximity of tree roots can disband pipeline protective coating, which creates a risk to the pipeline. Roots wrapping around the pipeline can damage the pipeline in the event of tree removal
- Ensuring that trees and large shrubs do not obscure the visibility of marker posts from one another
- Applicants to clearly show information about maximum size of root balls and maximum tree growth on landscape plans for APA to review.

APA's *Site Planning and Landscape National Guidelines* provide planting options with the objective to enhance social outcomes and visual amenity as shown in the examples in Figure 14-11.

14.6.5 Operation residual impact summary

With the implementation of mitigation measures as described in Section 14.6, residual impacts on landscape and visual amenity during operation are:

- A low degree of visual change from future restrictions on land use in the pipeline easement or restrictions on use of the easement area for tree planting and other landscape and visual enhancements impacting on landscape character. APA would allow the opportunity for the replacement of screening trees and shrubs, where reasonably requested and in consultation with affected landholder and/or responsible authority (EMM LV 5). In locations where the easement area may not be landscaped to provide replacement screening, visual enhancements could be introduced nearby. Additionally, a planting and remediation plan (EMM LV7) would ensure that trees and shrubs are reinstated in consultation with any affected landowners or authorities. There is the opportunity for landscape enhancement through the easement area in accordance with APA's *Site Planning and Landscape National Guidelines.*
- Discernible changes to the existing landscape character and visual amenity at VP9 and VP12 (located in LCA3 and LCA6) as a result of MLV2 and MLV3. MLV2 has existing screening that would be retained and trees and shrubs could be introduced to screen MLV3 from roads and residences, if reasonably requested by affected landholders and in consultation with APA and the responsible authority (EMM LV6).
- Impacts on the existing landscape character and visual amenity as a result of tree removal are considered to be low, with tree removal avoided where practicable (EMM LV1). One large native tree would be removed by the Project at the Jacksons Creek crossing and up to two large native trees and one small native tree at the Merri Creek crossing (refer to Figure 12.8 and 12.23 within Appendix HH of the Technical Report A Biodiversity). However, there are several large trees that would be retained in both of these locations and there would be a minor loss of vegetation which would not be uncharacteristic of the creekline environment, whereby there are already numerous gaps in vegetation cover. An arborist report would be undertaken on trees that screen private residences from road reserves to be retained immediately bordering the construction corridor where trimming would be required (EMM LV2).

A summary of the impacts on each landscape character area and viewpoint is presented in Table 14-2 and Table 14-3.

Table 14-2 Summary of landscape character impacts

Landscape Character Area	Name	Sensitivity to change	Magnitude of change	Significance of impact (pre-mitigation)	Significance of impact (post-mitigation)
LCA1	Creek corridor	Moderate	Moderate	Moderate	Low
LCA2	Extractive industry	Low	Low	Low	Low
LCA3	Flat to gently undulating farmland	Moderate	Low	Moderate-low	Low
LCA4	Residential and urban growth	Moderate	Low	Moderate-low	Low
LCA5	Semi-rural residential	Moderate	Moderate	Moderate	Low
LCA6	Land subject to development	Low	Negligible	Negligible	Negligible

Table 14-3 Summary of visual impacts

View Point	Name	Sensitivity to change	Magnitude of change	Significance of impact (pre-mitigation)	Significance of impact (post-mitigation)
VP01	Plumpton Regulating Station at Taylors Road	Negligible	Negligible	Negligible	Negligible
VP02	Beattys Road, within Westwood residential development	High	Negligible	Negligible	Negligible
VP03	Melton Hwy	Low	Low	Low	Low
VP04	Holden Road	Low	Low	Low	Low
VP05	Thompsons Road, facing Calder Fwy	Negligible	Negligible	Negligible	Negligible
VP06	Bulla-Diggers Rest Road	Negligible	Low	Negligible	Negligible
VP07	Sunbury Road	Low	Low	Low	Low
VP08	Wildwood Road	Moderate	Moderate	Moderate-low	Low
VP09	Oaklands Road	Moderate	Moderate	Moderate	Low
VP10	Mickleham Road	Moderate	Moderate	Moderate	Low
VP11	Donnybrook Road	Negligible	Negligible	Negligible	Negligible
VP12	Gunns Gully Road	Moderate	Moderate	Moderate	Low
VP13	Gunns Gully Road/ Hume Freeway	Low	Low	Low	Low
VP14	Oriel Road	Moderate	Negligible	Negligible	Negligible
VP15	Donnybrook Road	Low	Negligible	Negligible	Negligible
VP16	Summerhill Road	Low	Negligible	Negligible	Negligible

14.7 Cumulative impact assessment

The cumulative impacts of existing, planned and approved infrastructure, and utility projects within the area surrounding the Project, have been considered. The key major projects relevant are the OMR/E6 transport corridor and the Western Victorian Transmission Network Project.

The OMR/E6 transport corridor is proposed to create new road and rail transport links through the Werribee, Melton, Tullamarine, Craigieburn/Mickleham and Epping/Thomastown areas. The proposed corridor for the OMR/E6 has been reserved through a Public Acquisition Overlay that falls within the study area between KP 7 and KP 42. Construction of the OMR/E6 transport corridor is unlikely to start before 2030.

The Western Victorian Transmission Network Project is proposing to construct an above ground, 190 km electricity transmission line starting at Bulgana in Victoria's west and connecting to Sydenham via a new terminal station north of Ballarat. The project area of interest has been defined (a desktop analysis is being undertaken to identify and avoid sensitive areas), which falls within the study area between KP 0 and KP 8. The Western Victorian Transmission Network Project is of a much greater scale to that of the Project and may commence construction in late-2022, subject to approvals. The assessment considered the similarity to the Project in scale and form, the timing of the development, the combined visibility and the sequential visibility. For both projects the cumulative impacts have been assessed as minimal and unlikely to have any adverse visual impacts, considering the significant growth and change occurring in this region, the nature of the pipeline (that is, located underground) and the difference in scale between the projects.

14.8 Environmental management

14.8.1 Environmental management measures

Table 14-4 lists the recommended environmental management measures (EMMs) relevant to landscape and visual impact. In developing the environmental management measures, the landscape and visual impact assessment adhered to the mitigation hierarchy that is, an obligation to first avoid, minimise, restore and only after exhausting those measures, offset the residual impacts that remain. For the landscape and visual impact assessment, the first step of the mitigation hierarchy, avoidance, was preferred to manage environmental impacts that were identified. Where avoidance cannot be achieved, due to the nature of the Project, the existing conditions and/or the type of impacts, minimisation, is the next level in the mitigation hierarchy proposed which aims to ensure the impact is minimised as much as practicable.

Table 14-4 Environmental management measures

EMM #	Environmental Management Measure	Stage	Mitigation hierarchy
LV1	Avoid tree removal as far as reasonably practicable. Through detailed design and selection of construction methods identify and demarcate trees to be retained (within the construction corridor) that provide screening to private property residences. Protect trees to be retained in accordance with AS-4970 Protection of trees on development sites.	Design, construction	Avoidance
LV2	Prior to construction, undertake an arborist report on trees that screen private residences from road reserves to be retained immediately bordering the construction corridor where trimming would be required. The arborist assessment must consider any potential impacts on trees from proposed construction activities in accordance with AS-4970 Protection of trees on development sites.	Construction	Avoidance
LV3	Remove machinery, materials and temporary infrastructure from site as soon as it is no longer required. Keep construction laydown areas tidy and minimise dust in accordance with EMM AQ1.	Construction	Minimisation
LV4	Manage light generated during night construction activities such as HDD, in general accordance with the requirements in Australian Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting. Design lighting to minimise off-site light spill as far as reasonably practicable.	Construction	Minimisation
LV5	Where trees and shrubs within the approved construction area are lost and affect public places or existing screening of private residences from road reserves, replace trees and shrubs where practicable, reasonably requested and in consultation with the affected landholder and/or responsible authority. Undertake planting in accordance with the relevant bushfire management overlays for the area.	Construction	Minimisation
LV6	Introduce trees and shrubs to screen the mainline valve from roads and residences, if reasonably requested by affected landholders and with any necessary approvals granted (while meeting requirements of the Asset Protection Zone (APZ)).The planting of trees and shrubs must be undertaken in consultation with the affected landholder and/or responsible authority. Undertake planting in accordance with the relevant bushfire management overlays for the area.	Construction	Minimisation
LV7	Develop and implement a planting and remediation plan (applicable to screening trees directly impacted) where planting of trees and shrubs are proposed, in consultation with any affected landowners where requested. Planting will be undertaken with consideration of APA requirements for restricted uses within an easement and other necessary approvals granted. The plan must be reviewed by the responsible authority and/or affected landholder. The plan must outline a monitoring and defects period for planting and remediation.	Construction, Operation	Avoidance

14.8.2 Monitoring

To manage and monitor performance, the planting and remediation plan (EMM LV7) would be developed where planting of trees and shrubs are proposed. Planting would be undertaken 12 months after the reinstatement of the Project has occurred. The plan would consider any seasonal planting requirements and would be reviewed by the responsible authority and/or affected landholders. This plan would outline a monitoring and defects period for planting and remediation to ensure the significance of impacts remain low.

14.9 Conclusion

This chapter has identified and assessed existing conditions, impacts and mitigation to landscape values and visual amenity for the Project.

The potential landscape and visual residual impacts as a result of the Project have been assessed as low given the short duration and temporary nature of the proposed construction activities, the pipeline being located underground, and the nature of the existing landscape.

The existing conditions assessment identified that a significant portion of land within the study area is experiencing rapid development of residential areas, where construction activity would already be a common occurrence in these areas. Additionally, in rural areas as well as along major roads and highways, construction activity would be observed in relation to farming activity and as part of road upgrade and maintenance works.

Vegetation clearance required for the pipeline generally presented the most significant landscape and visual impacts, particularly within areas of close proximity to creek corridors and semi-rural residential areas along the pipeline alignment. The highest landscape character impacts were assigned a moderate overall significance pre-mitigation but with mitigation the residual significance of impact is assessed as low to negligible across all LCAs. Rehabilitation of land and replacement of trees and vegetation buffers where practicable would ensure that impacts on views from public places or private residences with existing screening from road reserves would be low.

MLV1 would be co-located with the existing Sunbury Pipeline MLV facility and MLV2 is likely to be hidden from view given the existing roadside vegetation at the site, resulting in minimal residual visual impacts on the existing conditions. MLV3 would represent a discernible change to the existing view, however, it has the potential to be mitigated through applications such as planting to provide screening from roads or residences (while meeting requirements of the APZ).

Lighting impacts as a result of the Project are expected to have negligible residual impact given their temporary nature and due to the nearest dwelling being located approximately 350 metres away from an HDD site (Deep Creek). There would be no night-time lighting from construction of the Project directly adjacent to residential areas elsewhere along the Project alignment.

The application of the Project's environmental management measures would minimise the residual landscape and visual impacts of the Project to low or negligible across the alignment.

In response to the EES evaluation objective described at the beginning of this chapter, effects of the Project on landscape values and visual amenity have been assessed and environmental management measures have been identified to minimise or avoid impacts on landscape values and visual amenity.