Minor Pipeline Corridor Realignments Modification to the Gloucester Gas Project













Minor Pipeline Corridor Realignments

Gloucester Gas Project modification | Environmental Assessment

Prepared for AGL Upstream Infrastructure Investments Pty Limited | 20 November 2013

Level 22, 101 Miller Street North Sydney, NSW, 2060

T +61 2 9921 2563

F +61 2 9921 2395 E - gloucester@agl.com.au Ground Floor, Suite 01, 20 Chandos Street St Leonards, NSW, 2065

> T +61 2 9493 9500 F +61 2 9493 9599

E info@emgamm.com

ENVIRONMENTAL ASSESSMENT CERTIFICATION

For submission of an environmental assessment (EA) under the NSW *Environmental Planning* and Assessment Act 1979

EA prepared by

Duncan Peake Jodi Kelehear

BSc (Hons) BSc (AdvSc –EnvSc) (Hons)

EMGA Mitchell McLennan Pty Limited Ground Floor 20 Chandos Street St Leonards NSW 2065

Applicant

AGL Upstream Infrastructure Investments Pty Limited Level 22, 101 Miller Street North Sydney NSW 2060

Proposed development

Minor Pipeline Corridor Realignments – Gloucester Gas Project modification Refer to Chapter 2 of the EA for a detailed description of the proposed modification

Land to be developed

Refer to Table 2.1 in the EA

Certification

We certify that we have prepared this EA in accordance with the relevant guidelines and requirements and to the best of our knowledge the information contained in this EA is neither false or misleading

Jodi Kelle

Duncan Peake Jodi Kelehear
Project Director Project Manager

20 November 2013 20 November 2013

Minor Pipeline Corridor Realignments

Gloucester Gas Project modification - Environmental Assessment

Prepared for AGL Upstream Infrastructure Investments Pty Limited | 20 November 2013

Principal author	Jodi Kelehear	Approved by	Duncan Peake
Position	Senior Environmental Scientist	Position	Associate Director
Signature	Joce Kelk	Signature	
Date	20 November 2013	Date	20 November 2013

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

© Reproduction of this report for educational or other non-commercial purposes is authorised without prior written permission from EMM provided the source is fully acknowledged. Reproduction of this report for resale or other commercial purposes is prohibited without EMM's prior written permission.

Document Control

Version	Date	Principal author	Reviewed by
Final	20 November 2013	Jodi Kelehear	Duncan Peake



T+61 (0)2 9493 9500 | F+61 (0)2 9493 9599

Ground Floor | Suite 01 | 20 Chandos Street | St Leonards | New South Wales | 2065 | Australia

emgamm.com

Executive Summary

ES1 Introduction

AGL Upstream Infrastructure Investments Pty Limited (AGL) has Commonwealth and State government approval to construct and operate the Gloucester Gas Project (GGP) in the Hunter region of NSW. The State government approval is under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and comprises Project approval (PA 08_015) and a broader Concept Plan approval (CA 08_0154). The Concept Plan approval covers the same aspects as the Project approval though also includes staged well field development within a broader 'Concept Area'.

The GGP includes extraction and processing of natural gas from coal seams, and transport and delivery of the natural gas to the existing supply network which services NSW markets. One component of the GGP is an approximately 95 to 100 kilometre (km) long underground high pressure gas transmission pipeline from a proposed central processing facility at Stratford, to a gas delivery station at Hexham. The approved GGP is described and assessed in detail in the AECOM (2009a) *Gloucester Gas Project Environmental Assessment* (EA).

This modification application relates only to the gas transmission pipeline and gas delivery station components of the GGP.

AGL has identified improvements to the pipeline alignment to further minimise its environmental impacts, avoid recently-constructed utilities, achieve economic and efficiency benefits, and to connect directly with AGL's approved Newcastle Gas Storage Facility (NGSF) at Tomago, rather than the Hexham Delivery Station (HDS). Minor realignments are proposed to four sections of the pipeline corridor and end of pipeline facilities are proposed within a compound at the NGSF connection point, referred to as the Tomago Receiving Station (TRS), which will be in place of the previously-proposed HDS.

The vast majority of the proposed realigned sections traverse cleared land. The proposed pipeline realignments reduce native vegetation clearing by approximately 1.69 hectares (ha), avoid a wetland area and reduce the number of watercourse crossings, including the number of crossings under the Hunter River (from two to one).

AGL is seeking approval to modify its Project and Concept Plan approvals under Section 75W of the EP&A Act, to allow for the four minor pipeline realignments and the TRS. AGL has engaged EMGA Mitchell McLennan Pty Limited (EMM) to prepare this EA of the proposed modification. EMM has further engaged the services of external specialists to assist with the hazard and risk and ecological assessments. This EA describes the proposed modification to the approved GGP, assesses the potential environmental impacts, and identifies environmental management, mitigation and monitoring measures required to address potential impacts. This includes referencing commitments from the original AECOM (2009a) EA and approval conditions, which will also be applied to the modified elements where relevant.

ES2 Overview of the proposed modification

The proposed modification is for four minor pipeline corridor realignments and connection to the NGSF via the TRS. Figure ES1 shows the approved and proposed modified pipeline corridor alignments. The realigned sections are the:

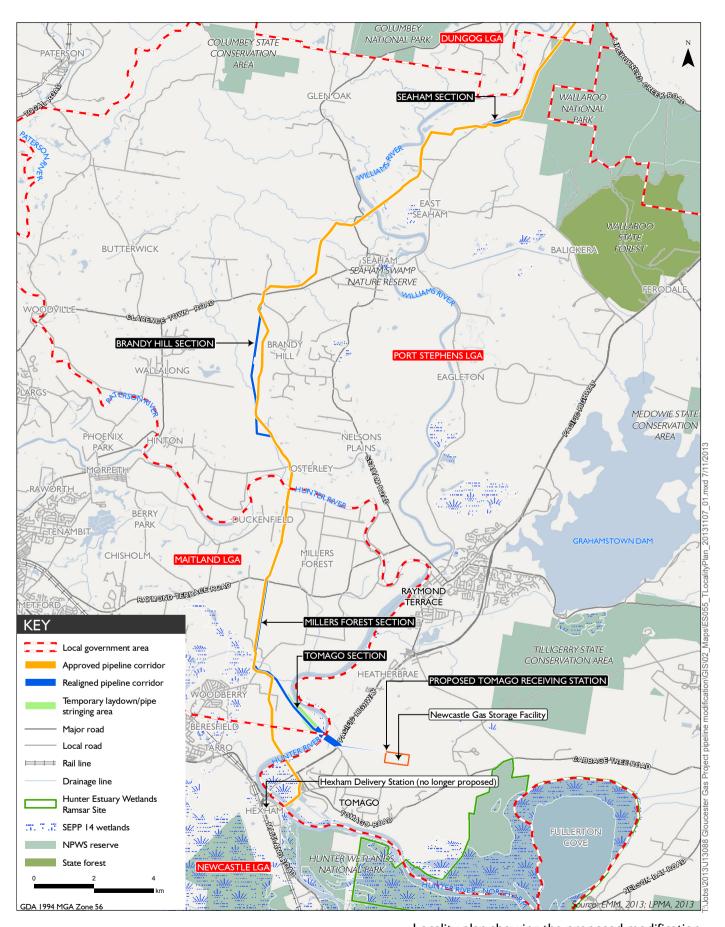
- Seaham section an approximately 0.65 km long section of pipeline corridor at East Seaham, proposed to be straightened and realigned up to 100 metres (m) north, to be mostly within a cleared area within and adjacent to a TransGrid transmission line easement.
- Brandy Hill section an approximately 5 km long section of pipeline corridor near Brandy Hill, proposed to be straightened and realigned generally up to 335 m west.
- Millers Forest section an approximately 2.5 km long section of pipeline corridor at Millers Forest, proposed to be realigned around 50 m east, to avoid the recently-constructed TransGrid electricity transmission line.
- Tomago section an approximately 6.5 km long section of the pipeline corridor's southern end, proposed to be realigned to connect with the NGSF at Tomago via the TRS. The proposed realignment avoids a wetland area, reduces disturbance to acid sulfate soils and only involves one crossing of the Hunter River (rather than the two crossings approved). Consistent with the approved pipeline, the river crossing is proposed to be by horizontal directional drilling (HDD).

The realigned sections of pipeline corridor generally traverse rural and semi-rural landscapes and cleared utility and access track corridors. Consistent with the approved project, it crosses roads, waterways and drainage lines. There are some residences in the surrounding area however the realigned sections of pipeline corridor are further from most of them than the approved route.

The proposed TRS is similar to the previously assessed and approved HDS. It will be adjacent to the NGSF, in the Tomago industrial area. Facilities will include a control room, filters, water bath heaters, water bath heater access pad, attenuator, pig receiver, regulators, valve and meter skids and odourant facility. Two options are being considered for the odourant facility's location, either within the TRS or within the adjacent NGSF compound.

The proposed pipeline construction and operating activities are unchanged from those described in the AECOM (2009a) EA for the original (approved) pipeline route. In summary, the pipeline will mostly be constructed by open trenching, though some sections will be by thrust boring or HDD. Construction will generally involve site preparation and excavation of a trench, followed by construction of the pipeline commencing with pipe stringing, through to lowering in, backfilling, clean up and rehabilitation. The pipeline will then be commissioned. The AECOM (2009a) EA identified that a main line valve (MLV) would be required approximately half way along the pipeline, and it formed part of the approved project. The preferred location of the MLV is now within the modified Seaham section, and it has been considered accordingly in this EA.

To allow flexibility in final siting and design of the pipeline, and consistent with the approach in the AECOM (2009a) EA for the approved project, this assessment has generally considered a 100 m wide pipeline corridor. However, the disturbance footprint for construction will be within a right of way (ROW) up to around 30 m wide. In some environmentally sensitive areas this will be reduced to 15 to 20 m. Positioning of the ROW within the pipeline corridor will be confirmed during its detailed design, taking into account constraints such as any environmental sensitivities identified in this EA. A temporary laydown and pipe stringing area is also proposed within and adjacent to the 100 m wide pipeline corridor at the Tomago section. Disturbed areas will be rehabilitated consistent with the existing land use after construction, with ongoing maintenance activities limited to an approximately 10 m wide easement above the buried pipeline.





ES3 Consultation

AGL has undertaken extensive stakeholder engagement and consultation about the broader GGP, including the gas transmission pipeline and HDS, since 2008. Consultation is ongoing and will continue throughout its construction and operation. Accordingly AGL has well established consultation tools and communication channels with GGP stakeholders, which have been used where possible in relation to the proposed modification. This includes the Gloucester Community Consultative Committee (GCCC) which was formed in 2008 and includes representatives from local government, MidCoast Water, local business, agriculture, industry, landowners, community groups and AGL.

Consultation specifically about the proposed modification has targeted landowners directly affected by the proposed realignments, Aboriginal groups registered as stakeholders for the pipeline corridor and the NSW Department of Planning and Infrastructure (DP&I). The pipeline corridor alignment and proposed siting of the ROW within the corridor have been developed with input from the landowners. Details of the proposed modification were published in a fact sheet on AGL's dedicated GGP website and in local newspapers. Other Commonwealth, State and local government agencies, TransGrid, the GCCC and all landowners along the pipeline corridor have also been notified of the proposed modification.

ES4 Potential impacts and management measures

ES4.1 Ecology

An ecological assessment of the proposed modification was prepared by Alison Hunt and Associates, with input by EMM's ecologists. This included reviewing previous ecological investigations, including several that covered the area of the proposed modified pipeline corridor alignment, as well as conducting field-based investigations.

One of AGL's drivers for the proposed pipeline corridor realignment is to reduce ecological impacts. This includes to reduce clearing of native vegetation and the Hunter Lowland Redgum Forest endangered ecological community (EEC), avoid a wetland area designated under State Environmental Planning Policy No. 14 – Coastal Wetlands (SEPP 14) and reduce the number of watercourse crossings.

The modified pipeline corridor alignment has been designed to avoid remnant native vegetation, paddock trees and riparian areas where possible. The vast majority traverses cleared land. Impacts to the Hunter River, fringing mangroves, SEPP 14 wetlands and downstream habitats will be avoided by use of HDD techniques. Other drainage lines to be crossed are ephemeral and/or artificially constructed, lack riparian vegetation, have low habitat value and were already approved to be crossed by the approved pipeline.

There are isolated patches of Hunter Lowland Redgum Forest and Swamp Oak Floodplain Forest within the Brandy Hill and Tomago sections which cannot be completely avoided. These are both EECs listed under the NSW *Threatened Species Conservation Act 1995*. AGL has committed to reducing the ROW from 30 m to 15 m in these areas and removal of mature trees will be avoided where feasible. For example, tree clearing within the largest patch of Hunter Lowland Redgum Forest to be traversed by the modified pipeline corridor is anticipated to be limited to two mature and six juvenile trees. Approximately 0.25 ha of Swamp Oak Floodplain Forest and 0.14 ha of Hunter Lowland Redgum Forest are anticipated to be cleared. This represents an approximately 1.69 ha reduction in native vegetation clearing compared to the approved project.

Impact assessments conducted in accordance with the relevant Commonwealth and State government guidelines concluded that the proposed modification is unlikely to result in any significant impacts to threatened species, endangered populations or EECs, provided that the proposed environmental management measures are implemented. These measures are captured in the existing Project approval conditions.

AGL has committed to a suite of ecological mitigation and management measures for the GGP, many of which will also be applied to the modified sections of pipeline and TRS. This includes a biodiversity offset strategy, currently being prepared in consultation with the Commonwealth Department of the Environment (DoE) and the NSW Office of Environment and Heritage (OEH). The strategy includes a proposed offset site south of the Seaham section, adjoining Wallaroo National Park. The existing approved measures are considered suitable for the proposed modification and on balance the proposed biodiversity offset site is considered to adequately compensate for the GPP's potential impacts, inclusive of the proposed modification. No additional measures are required.

ES4.2 Aboriginal cultural heritage

An Aboriginal cultural heritage assessment was prepared by EMM. This included reviewing previous heritage investigations, including several that covered the area of the proposed modified pipeline corridor alignment. Field surveys were undertaken by EMM archaeologists in conjunction with Registered Aboriginal Parties (RAPs).

No Aboriginal heritage sites or objects were identified during the surveys. While it is accepted that the broader landscape is of significance to Aboriginal people, research and consultation with the RAPs did not identify any specific Aboriginal social or cultural values associated with the Seaham, Brandy Hill, Millers Forest or Tomago sections. These areas are all considered to have low archaeological potential and no further Aboriginal heritage investigations are considered necessary within them.

In accordance with commitments in the AECOM (2009a) EA, an Aboriginal Heritage Management Plan will be developed, in consultation with the RAPs, with procedures to manage any Aboriginal objects or sites which may be encountered during construction. As per the existing Project approval conditions, this will include response measures for if previously unidentified Aboriginal object(s) are encountered and procedures for ongoing Aboriginal consultation and involvement. These existing approved measures are considered suitable for the proposed modification and no additional management or monitoring measures are required. Provided these measures are implemented, the proposed modification will not result in any additional impacts to Aboriginal cultural heritage beyond those identified in the AECOM (2009a) EA for the approved project.

ES4.3 Noise and vibration

A noise and vibration assessment was prepared by EMM. It included quantitative noise modelling and assessment for a range of pipeline and TRS construction and operating scenarios, using conservative worst-case assumptions. The assessment results are generally consistent with those in the AECOM (2009a) EA for the approved pipeline and HDS. No additional noise or vibration impacts were identified in association with the proposed activities. This is as expected given that:

- the proposed construction and operating activities for the modified pipeline corridor and TRS are generally unchanged from the approved pipeline corridor and HDS; and
- sensitive receptor offset distances from the modified pipeline corridor alignment are generally within the range identified and assessed for the approved alignment. The proposed TRS at Tomago is further from sensitive receptors than the previously-proposed HDS at Hexham.

Consistent with predictions for the approved pipeline corridor alignment, noise from short-term construction activities within the modified alignment is predicted to exceed the applicable criteria at nearby sensitive receptors. These temporary, short-term impacts can be appropriately managed by the existing approved management measures in the AECOM (2009a) EA and Project approval conditions. The duration of works (and associated noise exposure) for most locations along the pipeline corridor is expected to be less than three weeks.

No significant noise sources were identified in association with the proposed pipeline operation, other than short-term emergency venting at the MLV. Venting would be infrequent and temporary.

TRS operating noise was modelled and assessed for high and low flow conditions. This was done for calm weather conditions (no wind or temperature gradient) and a range of assessable meteorological conditions that could increase noise propagation toward sensitive receptors, for example source to receptor winds. The results show that noise levels from the TRS are predicted to comply with the relevant criteria at all sensitive receptors for all assessed scenarios and conditions. This is an improvement when compared with the previously-proposed HDS, which was closer to sensitive receptors and predicted to exceed the criteria at some locations.

A cumulative assessment was made considering existing industrial noise, predicted future operating noise from the approved NGSF, and predicted operating noise from the proposed TRS for a hypothetical unmitigated assessment scenario. Compliance was predicted at all sensitive receptors for all assessed scenarios and conditions, other than minor (up to 3 dBA) exceedances of the night-time criteria at some Tomago residences. These minor exceedances are limited to worst-case assessable meteorological conditions in the night (temperature inversion and prevailing source-to-receiver winds) and high flow operations at the TRS. The existing Project approval conditions include validation monitoring to confirm noise emission performance and determine any associated requirement for remedial measures. These measures are considered appropriate for the TRS.

The proposed modification does not result in any change to the road traffic noise, vibration or blasting assessment results from those for the approved project.

AGL has committed to noise and vibration management measures to address potential impacts of constructing and operating the pipeline and HDS, many of which will also be applied to the modified sections of pipeline and TRS. These are captured in the Project approval conditions and include construction and operational environmental management plans with measures to monitor and manage noise, vibration and blasting impacts; a community and stakeholder engagement plan; and a complaints procedure. These measures are considered suitable for the proposed modification and no additional measures are required. Provided they are implemented, the proposed modification will not result in any additional noise or vibration impacts to those identified in the original AECOM (2009a) EA for the approved project.

Modifications required to the existing Project approval conditions in respect of noise and vibration are the removal of measures applicable to the HDS, including operating noise limits, and insertion of limits applicable to the TRS.

ES4.4 Hazard and risk

An addendum to the GGP preliminary hazard analysis (PHA) was prepared by Planager Pty Limited (Planager) for the proposed modification. It involved a systematic assessment of the proposed modification against the same design and operational specifications assumed for the approved pipeline corridor alignment and HDS to evaluate whether the proposed modification would influence the results of the original PHA.

The original PHA determined risk transects which identified the minimum separation distances required from the pipeline and HDS to various land use types to ensure compliance with the relevant risk criteria defined in the Hazardous Industry Planning Advisory Paper (HIPAP) No. 4 guidelines (DP&I 2011b). The proposed realignments and TRS do not change these outcomes. Additionally, whilst the MLV facility was not previously assessed, as its location was not known, the risk is considered to be acceptable based on buffer distances to surrounding land uses.

The proposed TRS, adjacent to the NGSF, was also assessed and reviewed for accident propagation risk. It was concluded that the risks of propagation of an incident at the TRS to the adjacent NGSF, and vice versa, were negligible. Both options for the odourant facility's location were assessed, that is within the TRS or within the adjacent NGSF compound. Provided that the requirements of the relevant Australian standard (currently AS 1940) are adhered to, the probability of a fire involving odourant is negligible for both options.

The addendum to the PHA also considered potential cumulative risks from the proposed co-location of around 1.6 km of the pipeline in the same corridor as AGL's high pressure gas transmission pipeline to Hexham. Although extremely unlikely, co-location of the two pipelines within the 30 m wide easement introduces the theoretical potential for a domino incident from one pipeline to the other. Detailed design and construction of the pipeline to relevant standards will ensure this risk is minimised. This will be then quantified as part of the Final Hazard Analysis required under the Project approval.

The addendum to the PHA concluded that the proposed modification does not introduce undue risk to surrounding land uses. It does not result in the introduction of any unacceptable risks, and design and safety controls and management measures remain largely unchanged.

ES4.5 Other environmental considerations

i Soils and agricultural suitability

The proposed pipeline corridor realignments are relatively minor and traverse similar soil landscapes to the approved route. No additional soil or land capability-related impacts are anticipated to those previously assessed and approved. The existing approved management measures to be implemented during construction are considered appropriate for these sections and no additional measures are required.

As for the approved route, construction of the proposed realigned pipeline will encounter potential ASS. A draft ASSMP has been prepared. It includes applicable methods, protocols and contingencies to manage ASS should they be encountered during construction within these sections. The draft ASSMP will be updated to remove measures for the pipeline corridor connection into the HDS and include the relevant portions of the Tomago section.

ii Surface water and flooding

Construction of the modified sections of pipeline and TRS is not expected to result in additional surface water or flooding impacts to those identified in the AECOM (2009a) EA. The Brandy Hill, Millers Forest and Tomago sections traverse land prone to flooding. No permanent above-ground structures that would impede flood water are proposed in these areas.

The proposed modification reduces the number of watercourse crossings, including one less HDD crossing of the Hunter River. The construction techniques outlined in the AECOM (2009a) EA will be applied to these watercourse crossings following preparation of a Watercourse Crossing Management Strategy required under the Project approval, which will include baseline surveys and design details of crossings.

The existing approved management measures and techniques for watercourse crossings and erosion and sediment controls to be implemented during construction are considered appropriate for the proposed modified sections of pipeline corridor and TRS. Measures for these sections can be incorporated into the management plans required by the existing Project approval conditions. No additional measures are needed

No operational impacts to surface water are anticipated.

iii Groundwater

The groundwater environment of the proposed modified pipeline corridor alignment is generally the same as for the approved alignment. Of note are the Tomago-Tomaree-Stockton Sandbeds which underlay that part of the Tomago section east of the Hunter River (and also underlaid the approved pipeline corridor alignment). The Sandbeds aquifer is a low salinity, high yield water source that forms an important part of the regional potable water supply.

The construction techniques for the proposed modification are the same as for the approved GGP and so the proposed modification does not result in any change to the groundwater assessment results from those for the approved project.

In summary, no groundwater impacts are predicted during operations. It is unlikely that groundwater will be intercepted during construction works for most of the pipeline. However, shallow groundwater is likely to be encountered during construction within the eastern part of the Tomago section. Should dewatering be required in these areas it will be localised, minor (drawdowns of less than 1 m) and short-term. All extracted water will be reinjected into nearby shallow aquifers using spearpoints, which will further minimise changes in water levels. The groundwater assessment concluded the proposed works are not expected to adversely impact local aquifers or groundwater dependent ecosystems.

The existing measures in the Project approval conditions, including development of a Soil and Water Management Plan, are suitable for the proposed modification. No additional mitigation or management measures are required.

iv Air quality

Dust emissions from construction of the proposed modified sections of pipeline and TRS will be similar to those previously assessed and approved for the GGP. The proposed Construction Environmental Management Plan (CEMP), required under the existing Project approval, is considered appropriate to manage the potential short-term, temporary air quality impacts during construction of the modified sections of pipeline and TRS. No additional dust management or monitoring measures are considered necessary.

Minimal operational air emissions are anticipated from the proposed modification. However, the Project approval prescribes a monitoring and discharge point for the dual water bath heater at the HDS, with discharge limits for oxides of nitrogen and volatile organic compounds or carbon monoxide. While the proposed TRS at Tomago is further from sensitive receptors than the HDS at Hexham, AGL is committed to applying the existing approved monitoring requirements and discharge limits for the dual water bath heater to the proposed water bath heater at the TRS.

v Socio-economic

The impact of the proposed modification's construction to residential properties will be minimal. There may be temporary nuisance and amenity impacts to landowners and surrounding residents from access and works within the modified pipeline corridor alignments. However, access to properties will be maintained during pipeline construction and disturbed areas progressively rehabilitated consistent with the existing land use after construction, which will minimise impacts on land use. As required by the Project approval, a community and stakeholder engagement plan will be prepared and will incorporate the proposed modification.

vi European and non-Aboriginal heritage

No impacts to historic heritage beyond those assessed in the AECOM (2009a) EA are expected as a result of the proposed modification.

vii Visual

The proposed modification will not result in any significant change to visual impacts from those assessed in the AECOM (2009a) EA for the approved project. Construction activities (and associated short-term temporary visual impacts) will be closer to a small number of residences along the pipeline corridor than the approved alignment, however will be further from most potentially sensitive receptors. The pipeline will be buried and disturbed areas rehabilitated consistent with the existing land use after construction, which will avoid the potential for any long-term visual impacts. Surface infrastructure to which the proposed modification relates, being the MLV facility and TRS, is not expected to adversely impact visual amenity. The TRS will appear similar to the surrounding industrial facilities. The existing approved environmental safeguards are considered appropriate to manage any potential visual impacts.

viii Greenhouse gases

The proposed modification, principally the minor reduction in the total length of the pipeline, will result in a minor (approximately 0.08%) decrease in predicted annual greenhouse gas emissions from the GGP in its entirety.

ix Traffic and access

The proposed modification is not expected to result in any material change to traffic generation during construction or operations from that assessed in the AECOM (2009a) EA for the approved project. Traffic generation was predicted to be minimal compared to background road traffic volumes. Roads to be used by vehicles accessing the proposed modified sections of pipeline corridor and TRS will be generally consistent with those to be used for the approved GGP. All public roads to be crossed by the proposed modified pipeline corridor alignment are crossed by the approved alignment. The existing traffic, transport and access management measures in the Project approval conditions are suitable for the proposed modification and no additional mitigation or management measures are required.

x Bushfire

A Fire Safety Study and Construction Safety Study will be prepared, as required by the Project approval, prior to starting construction. It is considered that these requirements are sufficient to effectively manage any bushfire risk for the proposed pipeline corridor realignments and the TRS.

i Cumulative impacts

The proposed modification will have minimal environmental consequences beyond the approved GGP. It will result in some environmental benefits including an overall reduction in the length of the pipeline and area to be disturbed during construction and reduced vegetation clearing. Given this and minimal effects assessed cumulatively from the adjacent NGSF in the noise and hazard and risk assessments, cumulative impacts from the proposed modification are not anticipated.

ES5 Project justification and conclusion

The original AECOM (2009a) EA concluded that the GGP was justifiable on biophysical, economic and social terms, provided that the recommended mitigation and management measures were implemented. This proposed modification is minor and has resulted from identified improvements to the pipeline alignment to further minimise its environmental impacts, avoid recently-constructed utilities, achieve economic and efficiency benefits, and to connect directly with AGL's approved NGSF at Tomago, rather than the HDS.

The proposed realignments at Seaham and Brandy Hill are to straighten up and shorten these sections of pipeline and to reduce vegetation clearing and other environmental impacts. These proposed alignments are preferred when considering constructability, reduced cost and environmental impacts, and schedule advantages. They were not previously achievable due to landholder access matters, which have now been resolved. The proposed realignment at Millers Forest is needed to avoid an electricity transmission line which was recently constructed within AGL's approved pipeline corridor.

The proposed realignment in the Tomago section would also result in environmental benefits as it will avoid SEPP 14 wetlands assumed to be impacted in the AECOM (2009a) EA, reduce ASS disturbance, and only involves one crossing of the Hunter River (rather than two), at a location further upstream of the Hunter Estuary Wetlands Ramsar site and Hunter Wetlands National Park than currently approved. It also reduces the number of road and infrastructure crossings required.

The realigned sections utilise existing cleared areas where practical, including utility easements, and are mostly further from sensitive receptors than currently approved.

Connecting the GGP to the NGSF via the TRS (rather than the previously proposed HDS) will allow natural gas from the GGP to be supplied directly to NSW markets and also to be stored at the NGSF for later use. This will assist AGL in meeting variability in gas demand, including peak demands for the Sydney-Newcastle market. Provision for storage of this natural gas will also allow AGL to produce gas from the GGP at a more consistent rate.

Based on the outcomes of this EA it is concluded that once AGL's existing committed mitigations are applied, all the potential environmental impacts identified became low risk. The EA did not identify any significant residual environmental risks associated with the proposed modification.

The proposed modification is strongly justified through the orderly and logical use of natural, physical and human resources. The existing environmental safeguards and mitigation measures recommended in the AECOM (2009a) EA and included in the Project approval will be sufficient to manage the potential impacts of the proposed modification. The benefits of the proposed modification largely outweigh its costs and it is considered to be in the public interest for it to be positively determined.