1.0 Background

ICD Asia Pacific contacted Jeff Jones from Project Delivery Assurance (pda) to assist in providing a response to the Secretary's Environmental Assessment Requirements (SEARs) in relation to the proposed new East Leppington Primary School application by the NSW Department of Education (the applicant).

This addendum aims to address the specific matters raised in Key Issue #15 as part of the applicants consolidated EIS response.

This response is provided by Jeff Jones acting as an independent pipeline industry consultant. Refer https://www.projectdeliveryassurance.com.au/pipelines.html

2.0 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements are in relation to Section 4.12(8) of the Environmental Planning and Assessment Act and Schedule 2 of the Environmental Planning and Assessment Regulation 2000 whereby the applicants' Environmental Impact Statement (EIS) must be prepared in accordance with, and meet the minimum requirements of, clauses 6 and 7 of Schedule 2 the Environmental Planning and Assessment Regulation 2000 (the Regulation). The SEAR's contains twenty-three key issues of which issue #15 specifically deals with "Hazards and Risks" as follows:

a) Report on the consultation outcomes with all operators of high pressure dangerous goods or gas pipelines within or in the vicinity of the proposal with regards to Australian Standard 2885 Pipelines – Gas and liquid petroleum (AS 2885); and

b) Include a hazard analysis undertaken in accordance with the Department of Planning's Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' and Multi-Level Risk Assessment (DoP, 2011). The hazard analysis must include, and not be limited to:
   - estimating the cumulative risk to the proposed development from all high pressure dangerous goods or gas pipelines that are within or in the vicinity of the proposed development. If multiple pipelines are identified within common easements or multiple pipelines are adjacent to each other, incident propagation risks must be included in the analysis;
   - demonstrating that the proposed development would comply with the relevant qualitative and quantitative risk criteria detailed in the Department of Planning's Hazardous Industry Planning Advisory Paper No. 10, 'Land Use Safety Planning';
   - reporting all significant outcomes and all actions or recommendations arising from a Safety Management Study prepared as required under AS 2885 and with the involvement of all pipeline operators; and
   - providing preliminary emergency management and incident response planning, prepared in consultation with all relevant emergency combat agencies and pipeline operators, to address incidents from high pressure dangerous goods and gas pipelines

This addendum addresses both points in Section 3 & 4 respectively below.

3.0 Report on consultative outcomes with pipeline operators

SEARs Requirement: Report on the consultation outcomes with all operators of high pressure dangerous goods or gas pipelines within or in the vicinity of the proposal with regards to Australian Standard 2885 Pipelines – Gas and liquid petroleum (AS 2885).

3.1 Consultation processes

The application of AS2885 Pipelines – Gas and liquid petroleum (AS2885) has been used as the basis for consultation processes with operators of high-pressure dangerous goods or gas pipelines within or in the vicinity of the proposal, as per the requirements of AS2885 Part 3 (Operation and maintenance) clause 7.5.4 below:

> **7.5.5 Encroachment/location class**
> Any change of land use near the pipeline requires the Licensee to review the pipeline's safety management study to assess the impact and advise the developer of the impact identified as a result of the change in land use. Additional mitigation measures may be required to meet the requirements of AS 2885.1, particularly where land use changes become high consequence areas and more stringent control requirements arise.
> The Licensee shall establish the necessary management procedures for all known and proposed land use changes around the pipeline and be ready to implement changes for future planned land use. When a known proposed development is identified, the Licensee shall undertake a safety management study and confirm the pipeline integrity, both its structural strength and coating condition, to ensure continuous safe and reliable pipeline operation for the proposed new operating environment.

Per the above underlined sentence of AS2885 Part 3 clause 7.5.5, the key consultation process required is for the applicant to engage with the pipeline licensee(s) or nominated operator, regarding the proposed land use change. As such, this pda compiled addendum refers to the Safety Management Study (SMS) undertaken by ICD (Asia Pacific) Pty Ltd and report prepared for the applicant (refer ICD document no. 10166-M-0001).

The relevant pipelines were identified through application of the AS2885 prescribed process of evaluating the proposed land use change within the pipeline/s measurement length, defined by the pipeline 4.7kW/m2 radiation contour for an ignited full bore rupture of that pipeline measured from the school property boundary. This is illustrated in Figure 1 below, which is an extract from SMS Report Appendix E, showing the Ethane pipeline measured contour from the school and the affected section of the Ethane pipeline.

As detailed in the ICD SMS Report, there are three high-pressure petroleum pipelines identified that are potentially affected by the proposed school. These include the Eastern Gas Pipeline (Jemena), NSW JGN Trunkline (Jemena) and the NSW Moomba to Sydney Ethane Pipeline (APA Group). Refer figure 2 below with extract from the ICD SMS report.

Consequently, the SMS involved consultation and participation with Jemena and APA Group in the preparation of the SMS undertaken in accordance with AS2885 Part 6 and validated by a workshop on the 11th July 2019.

***Note** - Section 5 of the ICD SMS Report also makes reference to previous consultation and SMS undertaken with the licensees in August 2011 and 2007. Both forums are reported to have identified and generated actions and recommendations for the stakeholders at the time, noting that the same threats associated with the specific land use change due to the school that were identified previously in the 2011 and 2007 SMSs still apply and were reassessed in the ICD SMS.*

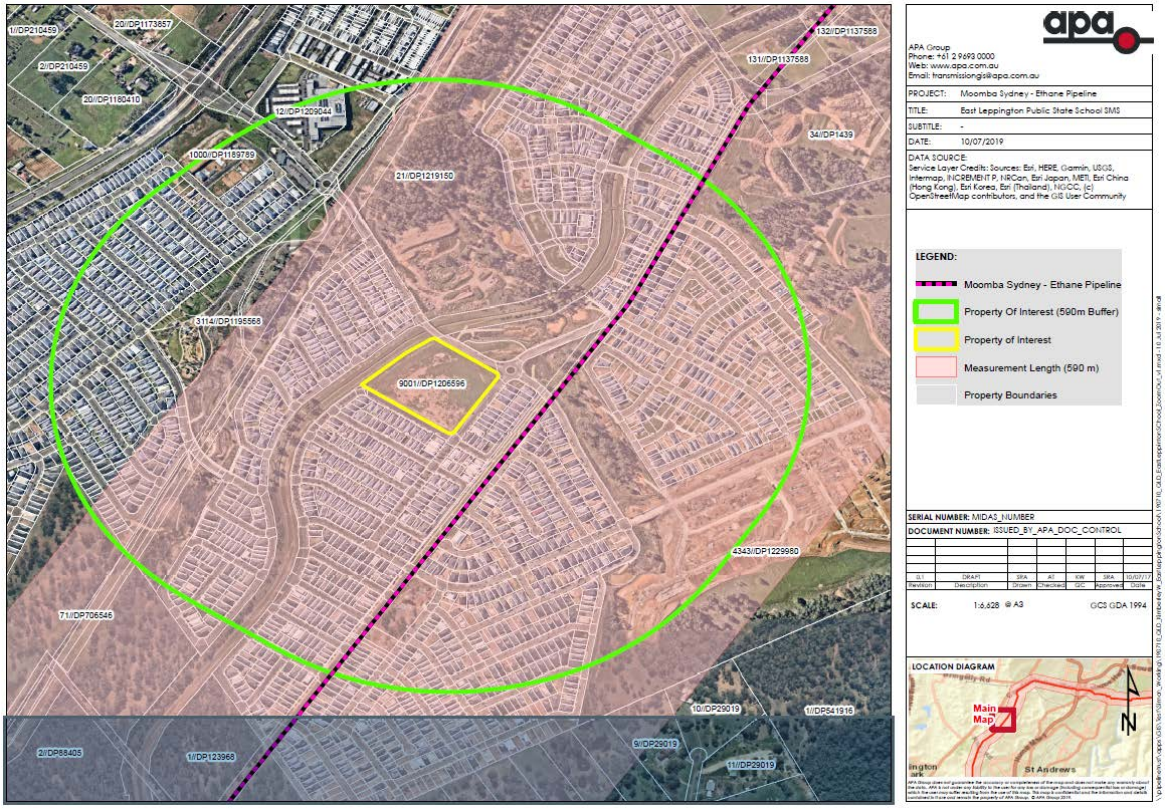

Figure 1 - Ethane Pipeline 4.7kw/m2 Radiation Contour GIS Map

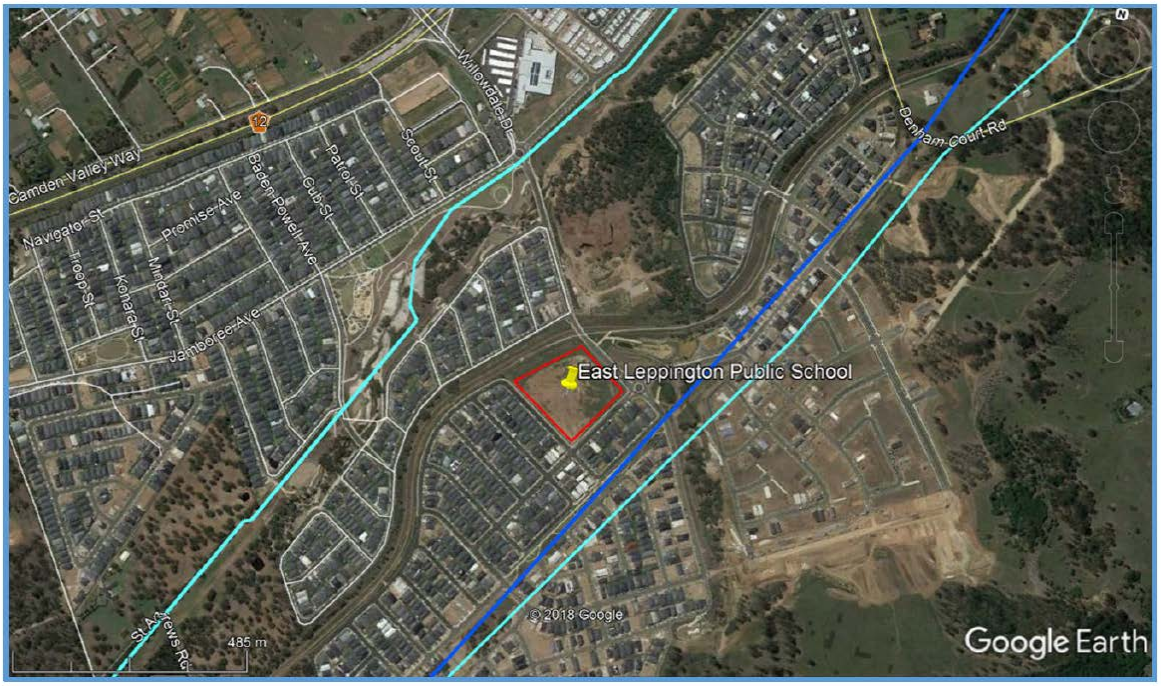

Figure 2 – Identified pipelines for consultation with Licensee (Operator)

The SMS was conducted in accordance with the process detailed in AS2885 Part 6. The validation workshop is a key collaborative forum in the consultation process and undertook the following activities to implement the safety management process:

- Discussed the current location of the proposed primary school and agreed on the location class for the pipelines.
- Reviewed 'Sensitive Use' land use change threats already identified
- Identified any further site-specific threats to energy pipelines
- Identified and reviewed the effectiveness of the existing physical and procedural controls that exist to mitigate credible threats
- Proposed additional control measures and actions

The SMS Report specifically states that "*in particular its inputs and outputs, have been reviewed by the relevant stakeholders to ensure the details are accurate at the date of issue of this report*".

Conclusion #1: *Adequate consultation processes has been undertaken between the applicant and the pipeline licensees per the requirements of AS2885.*

3.2 Consultation Outcomes

The ICD SMS report contained the following conclusions:

a) All identified threats to the energy pipelines due to the land use change have been mitigated to an acceptable level by a combination of control measures.
b) Provided that all actions are closed out and all control measures referenced in the SMS worksheets are implemented, the SMS workshop found that there were no unacceptable threats to the affected energy pipelines from the land use change brought about by the school development.
c) It is recommended that the pipeline owners review the status of all threats identified in this workshop on an ongoing basis in line with their relevant pipeline SMS processes.

The next steps agreed between the stakeholders were documented in the SMS report as follows:

1. Pipeline owners to review the actions and recommendations from this SMS workshop and provide to SINSW their requirements for the work required to ensure that physical and procedural controls identified by each pipeline owner are incorporated that will allow the school development to proceed.
2. Ongoing interaction between the stakeholders to achieve the outcomes required by all parties.

Further correspondence (refer emails listed in appendix A) has been received by the proponent from both licensees, including confirmation that the SMS actions have been accepted and completed.

Conclusion #2: *The consultation outcomes detailed in the ICD SMS report seem reasonable and appropriate from an industry benchmark perspective; in terms of application of AS2885.6 safety management process and outcomes for the context of the proposed land use change for the identified existing pipelines, including location class review and analysis of threat control.*

4.0 Hazard Analysis

4.1 NSW Department of Planning and Environment Planning Circular

***SEARs Requirement**:* Include a hazard analysis undertaken in accordance with the Department of Planning's Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' and Multi-Level Risk Assessment (DoP, 2011).

The SEAR's make reference to application of the Department of Planning's Hazardous Industry Planning Advisory Paper No. 6 (HIPAP-6), 'Hazard Analysis' and Multi-Level Risk Assessment (DoP, 2011). Reference to HIPAPs stems from the NSW Department of Planning and Environment Planning Circular (PS 18-010), issued 26 October 2018.

As per the stated purpose in the Planning Circular, "*the circular advises councils and developers of the mandatory notification and assessment requirements for development near pipelines listed under clause 66C of State Environmental Planning Policy (Infrastructure) 2007 (known as the Infrastructure SEPP). Clause 66C of the Infrastructure SEPP lists high pressure pipelines used for the transport of dangerous goods. These pipelines have a level of risk which must be assessed when considering development near the pipelines, to ensure that risks to people, property and the pipelines are within acceptable levels*".

The Planning Circular reinforces that high-pressure pipelines are designed, constructed, tested, operated and maintained in accordance with Australian Standard AS 2885 and licenced under the NSW Pipelines Act 1967. From the Act, the NSW Pipelines Regulation 2013 also ensures that licensed pipeline is designed, constructed, maintained and operated in a safe and reliable manner.

The Planning Circular also refers to Clause 66C of the Infrastructure SEPP aims to protect people from unacceptable levels of risk from high pressure pipelines, whilst also protecting the pipelines themselves. Specifically, clause 66C requires the consent authority to be satisfied that the potential safety risks or risks to the integrity of the pipeline that are associated with the development to which the application relates have been identified, and to take those risks into consideration in the assessment of development.

Further, the Planning Circular states "*such development should consider preparing a risk assessment as part of the development application to demonstrate that the development will comply with the risk criteria for land use safety planning published in Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning. It is important to have a comprehensive understanding of the hazards and risks associated with the operation of the pipeline and of the adequacy of safeguards*".

Given the Planning Circular reference to AS2885 it can be reasonably demonstrated that the risk assessment process embedded within the AS2885 prescribed safety management study process is adequate and conclusive for satisfying the intent of the planning circular and HIPAP's.

The explicit aims of the AS2885 SMS process are to take into account the protection of people within the measurement length by the application of the AS2885 Location Classification process and threat analysis. As long as the SMS actions are adhered to by the stakeholders then the consideration of hazard analysis consequences to people is inherent within the SMS process.

Int his regard, this addendum postulates that the intent of the HIPAPs has been satisfied by the applicant engaging with the pipeline(s) licensees in application and completion of the AS2885 SMS process including the prescribed pipeline threat risk assessment process.

Conclusion #3: *The intent of the HIPAPs hazard analysis has been satisfied through the application and completion of the AS2885 Safety Management Study process.*

4.2 Estimating Cumulative Risk

SEARs Requirement*: estimating the cumulative risk to the proposed development from all high pressure dangerous goods or gas pipelines that are within or in the vicinity of the proposed development. If multiple pipelines are identified within common easements or multiple pipelines are adjacent to each other, incident propagation risks must be included in the analysis.*

The AS885 safety management process requires the identification of all threats to the pipeline/s and as part of this process the consequences of a pipeline failure from an uncontrolled threat must be assessed. The consequences for a pipeline failure are fundamentally concerned with the impacts to people, the environment & supply, as per the metrics of the AS2885 risk matrix.

The consequences to people are normally assessed through evaluation of the population density within the radiation contour associated with the identified threat scenario.

In the case of pipelines being located within a common easement the propagation risk is considered on a case by case basis and will depend on the distance between pipelines and their relative depth of burial and the nature of the pipeline failure.

For most cases of buried multiple pipelines the industry approach is normally to limit the failure scenario to a single pipeline, on the basis that any extreme failure of a pipeline is likely to result in the energy release creating an isolated incident area, with adjacent or nearby pipelines being shielded by their separation and burial distances.

There are also no known incidents involving incident propagation between adjacent pipelines in industry reference databases.

Since there are no other known sources of dangerous goods within the vicinity of the proposed development there appears to be no basis for cumulative risk assessment.

Conclusion #4: *There are no pipelines threat scenarios identified that would result in incident propagation nor any other identified sources of dangerous goods that would result in cumulative risk.*

4.3 Risk Criteria

Secretary's Environmental Assessment Requirements Item 15. Hazards and Risks

SEARs Requirement: *demonstrating that the proposed development would comply with the relevant qualitative and quantitative risk criteria detailed in the Department of Planning's Hazardous Industry Planning Advisory Paper No. 10, 'Land Use Safety Planning'.*

The prescribed process in AS2885 has been followed as demonstrated in the ICD SMS report. The AS2885 process adopts a qualitative risk assessment process as per Figure 3 below.

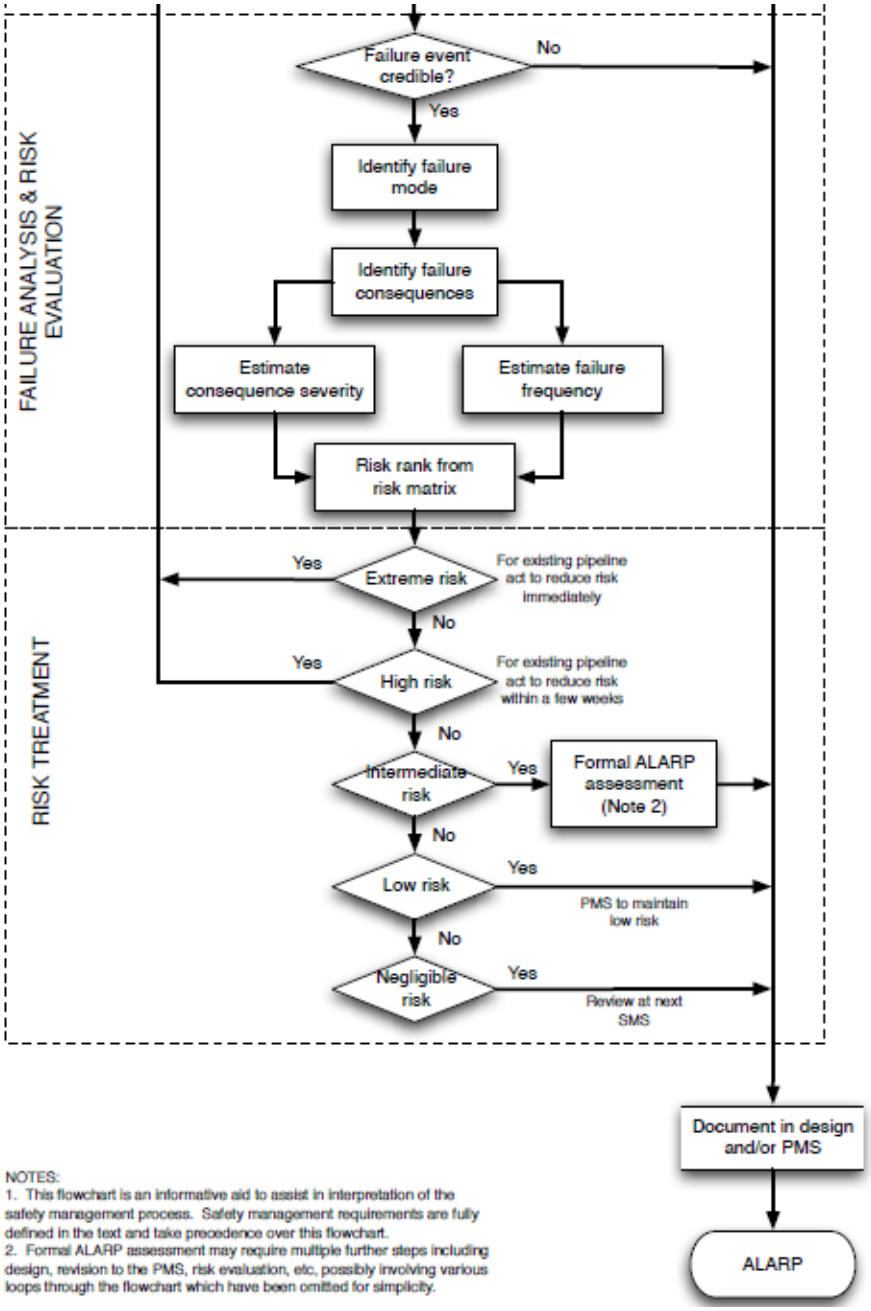

Figure 3 – AS2885 Risk Assessment

The AS2885 risk assessment process utilises an industry prescribed risk matrix and associated severity and frequency classes (refer AS2885 Part 6 Section 3).

The rationale for the application of a qualitative risk assessment is detailed in AS2885 Part 6 Section 3.5.1 with caution regarding use of quantitative risk analysis as per the note extract below.

> NOTE: Quantitative RISK ASSESSMENT methods need to be used with great care. Classical quantitative RISK ASSESSMENT using historical failure rates is not valid for determining the absolute risk level of Australian and New Zealand pipelines due to the lack of relevant statistical data. The failure rate of Australian pipelines has been assessed to be at least an order of magnitude lower than pipelines in other parts of the world so use of historical failure rates from overseas will generate unrealistically conservative results. Reliability-based analysis such as permitted by Canadian Standard CSA Z662 may have more validity.

Any further risk assessment (qualitative or quantitative) of pipeline threats in this assessment is not recommended or required.

Conclusion #5: *The ICD SMS has applied the prescribed AS2885 qualitative risk assessment including risk matrix and classifications. As per guidance in AS2885.6 any further risk assessment (qualitative or quantitative) is not recommended or required in this case.*

4.4 AS2885 SMS Outcomes

SEARs Requirement: *reporting all significant outcomes and all actions or recommendations arising from a Safety Management Study prepared as required under AS 2885 and with the involvement of all pipeline operators.*

Consultation of pipeline operators has been discussed in section 3 of this addendum report.

With reference to the ICD SMS report, there were five (5) corrective actions relating to threats recorded in this SMS workshop. They are summarised in the table below.

Action	By
Review spacing of pipeline marker signs in the affected pipeline section to comply with T2 location requirements.	Jemena / APA Group
Review and confirm pipeline resistance to penetration and radiation contour calculations.	Jemena / APA Group
Assess and mitigate this risk to ensure the pipeline is maintained to a level of risk where the residual risk of this threat is Intermediate and ALARP or to a lower level as required by AS2885.6.	APA Group
Conduct an ALARP assessment on HDD penetration onto the Ethane pipeline.	APA Group

Conclusion #6: *The AS2885 SMS outcomes have been satisfactorily presented in the ICD SMS Report including conclusions and required actions.*

4.5 Emergency Management & Incident Response

***SEARs Requirement**: providing preliminary emergency management and incident response planning, prepared in consultation with all relevant emergency combat agencies and pipeline operators, to address incidents from high pressure dangerous goods and gas pipelines.*

Pipeline licensees (operators) are required to develop and implement an emergency response plan (ERP) detailing response and recovery strategies that incorporate procedures to address all pipeline related emergency events.

The pipeline ERP must address safety of public and all personnel, stakeholder communication protocols, coordination with key stakeholders (such as emergency services), recovery and restoration of operations, protection and remediation of the environment and training and competency of emergency response personnel.

The licensee is also required to undertake liaison with landowners and inform relevant stakeholders of the pipeline hazards. This process will ensure that the applicant is kept aware of the pipeline status for considering the pipeline in the school's own emergency response planning and procedures.

The school's emergency management and response planning, with respect to the high pressure pipeline hazards, shall be developed in consultation with the pipeline licensees (operators) and the outcomes from the SMS report.

***Conclusion #7:** The applicant should be aware of the license(s) pipeline Emergency Response Procedures and shall consider inclusion of pipeline hazard emergency in their own emergency planning and procedures for the school.*

6.0 Conclusions

The following conclusions have been made in this addendum in response to SEARs item #15;

Conclusion #1: *Adequate consultation processes has been undertaken between the applicant and the pipeline licenses per the requirements of AS2885.*

Conclusion #2: *The consultation outcomes detailed in the ICD SMS report seem reasonable and appropriate from an industry benchmark perspective; in terms of application of AS2885.6 safety management process and outcomes for the context of the proposed land use change for the identified existing pipelines, including location class review and analysis of threat control.*

Conclusion #3: *The intent of the HIPAPs hazard analysis has been satisfied through the application and completion of the AS2885 Safety Management Study process.*

Conclusion #4: *There are no pipelines threat scenarios identified that would result in incident propagation nor any other identified sources of dangerous goods that would result in cumulative risk.*

Conclusion #5: *The ICD SMS has applied the prescribed AS2885 qualitative risk assessment including risk matrix and classifications. As per guidance in AS2885.6 any further risk assessment (qualitative or quantitative) is not recommended or required in this case.*

Conclusion #6: *The AS2885 SMS outcomes have been satisfactorily presented in the ICD SMS Report including conclusions and required actions.*

Conclusion #7: *The applicant should be aware of the license(s) pipeline Emergency Response Procedures and shall consider inclusion of pipeline hazard emergency in their own emergency planning and procedures for the school.*

It is recommended that all conclusions are included in the applicants EIS response to address the Secretary's Environmental Assessment Requirements.

Document Number	Status	Date	Created By
ICD 10166-M-0002	Updated with licensee SMS responses	6/4/2020	Jeff Jones
ICD 10166-M-0002	Issued for Use	1/4/2020	Jeff Jones

Appendix A - Reference Documents

1. Secretary's Environmental Assessment Requirements – SSD 9476, issued 30/5/19
2. ICD Safety Management Study Report – doc no 10166-M-0001
3. NSW Planning Circular
4. AS2885 Pipelines – Gas and liquid petroleum
    a. Part 0 – General Requirements
    b. Part 3 – Operation and maintenance
    c. Part 6 – Pipeline safety management
5. Email correspondence
    a. Jemena to TSA dated 2/4/20
    b. APA Group to TSA dated 23/3/20