



TRANSPORT AND LOGISTICS CENTRE

DRAFT DISCUSSION PAPER

TRANSPORT SAFETY MANAGEMENT: DEVELOPING A LEARNING PATHWAY

ISSUES AND POSSIBLE SCENARIOS

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EXECUTIVE SUMMARY

Purpose

The aim of this draft discussion paper is to propose a strategy and possible design scenarios for a seamless learning pathway in transport safety management.

The policy and institutional issues canvassed in this paper are structured to a large degree by the challenges in developing educational and “skill-in-practice” learning streams that are multi-disciplinary in approach, industry endorsed and directed towards achieving nationally recognised qualifications.

The Transport and Logistics Centre (TALC) requested the preparation of this paper as a first step to obtain the views of key stakeholders on possible ways to advance the pathway project. To this end, the paper is general in nature and does not attempt a definitive critique of the theory, the system-driven elements or integrative regimes associated with transport safety management.

Key Questions and Principles

There are four critical questions which this paper seeks to explore. These are:

- › Is there an overriding case for focusing considerable institutional and resourcing efforts to structure transport safety management as a seamless learning pathway?
- › How extensive are the challenges and their impact on pathway development and future delivery?
- › Can baseline learning streams be developed to ensure compatibility with all transport modes given their different operational tasks and regulatory compliance requirements?
- › What measures could be taken in the short to longer term to address the identified challenges and make the pathway an achievable plan?

The key principles that underpin the paper’s approach to evaluating the pathway project are as follows:

- **Public Safety Imperative**
To ensure a safety capability building strategy that is responsive and capable of delivering continuous improvements to assure the traveling public that the various transport modes are as safe as possible.
- **Coordination and Resourcing**
To appreciate that making recommendations for a pathway initiative will achieve nothing if they are not matched by proper planning, coordination, stakeholder collaboration and resourcing.
- **Linking Education and Training**
To recognise that the linking of formal educational qualifications with continuous workplace training is an essential element to ensuring skilled safety performance.
- **Waterfall Special Commission of Inquiry**
To draw on the detailed analysis of the Waterfall Special Commission of Inquiry as a basis for further discussion in relation to developing an indicative learning stream framework that could be applied to the pathway.
- **Aligning Strategy with Transport Mode Needs**
To ensure the educational and training streams are aligned with the needs of the different transport modes and, to use the NSW context, the performance requirements set by the Independent Transport Safety and Reliability Regulator (ITSRR).
- **Stakeholder Support**
To minimise the extent of implementation challenges through securing the endorsement of and partnership between the transport modes, industry and the educational sectors.

- **Project Delivery**

To maximise support for the pathway project through proper project management, based on stakeholder participation, realistic milestones and achievable outcomes.

Main Issues

The paper begins by looking at the current policy and institutional context. This work seeks to identify the major influences and implementation challenges for the pathway project. These challenges range from the cross-sectoral complexities of the education system (such as the poor structural linkages between school, vocational and higher educational sectors that adversely impact on learning and development outcomes) to the emerging skill shortages in the transport industry.

The Waterfall Special Commission of Inquiry (SCOI) is seen as establishing the case for singling out transport safety management as an educational and vocational priority. This is evidenced in the scope of the SCOI's recommendations dealing with managerial competency, formal qualifications, training and system integration for effective rail safety management.

As the SCOI recognised, the task of implementing these recommendations is neither a speedy nor simple endeavour. For example, the complexity associated with devising and introducing an integrated safety management system is a pervasive issue. These reform tasks are not helped by the fact that there is no formal educational qualifying program in place, at either State or national levels, which is capable of providing the type of multi-disciplinary learning and skills training that were advocated by the SCOI.

The paper draws on the SCOI's safety review elements as a basis for further discussion on the development of learning streams for the proposed pathway. Compatibility of these streams with the different transport modes is factored into this evaluation.

It needs to be emphasised that the learning streams developed in this paper are indicative rather than inclusive. Their primary purpose is to act as a discussion platform through which to closely engage stakeholders in both considering the way forward and the case for structured collaboration and partnership.

Possible Pathway Scenarios

A number of pathway scenario designs are presented for further consideration. The scenarios cover the transition from school to vocational education and training (VET), and from higher education to VET.

Certain assumptions underpin the scenario designs. Foremost is their treatment as "greenfields" opportunities made possible by stronger linkages and collaboration between the educational sectors and industry than is currently the case. Certainty of implementation funding and trained teaching staff are also assumed for the scenarios.

On the immediate question of how to advance the pathway project, the paper sets out a suggested Plan of Action for discussion. The Plan is based on short and longer term tasks. These proposals include:

- › Seeking the participation of ITSRR in considering the proposed strategy outlined in this paper;
- › Securing ITSRR, the various educational sectors and industry as committed stakeholders in the project;
- › Formalising, in the short to medium term, a memorandum of understanding between stakeholders on pathway evaluation and delivery approach for the primary and secondary school sectors; and
- › Investigating and formalising, in the medium to longer term, a consortium involving industry, VET and higher education providers with the dual task of developing and delivering the new programs.

1.0 POLICY AND INSTITUTIONAL CONTEXT

This Section deals with the current policy and institutional context for pathway development. A profile of how this context establishes the necessity for a transport safety management pathway is at Appendix 6.1. The comments below provide an overview of these influencing factors and the implementation challenges.

1.1 Pathway Initiative

The Transport Safety Management Learning Pathway is one of a number of learning pathways being developed by the Transport and Logistics Centre (TALC). Nationally, there is no formal educational qualifying program in place to deliver the type of comprehensive learning and skills training envisaged by the pathway project in transport safety management.

At the risk of over-simplifying, a pathway can be defined as a learning framework moving across school, vocational education and training, and university that offer industry endorsed, life-long educational and "skill-in-practice" training improvement.

Pathways are seamless in their capacity to allow participants entry at various points of the education system in order to acquire the necessary formal qualifications and industry training. In many learning pathways, entry is at school level. This involves study that is either directly or indirectly related to a specific career choice and covers the transition from schooling, vocational education and training (VET), and higher education.

The active participation of industry in the pathway is a major driver for the delivery of skill relevant training and work placement. A key outcome is the achievement of nationally recognised qualifications.

1.2 Influencing Factors

The national drivers for seamless pathways are diverse. They range from issues covering regulatory and institutional performance outcomes, to concerns about workforce skill shortages and industry innovation. For transport safety as profiled at Appendix 6.1, the key drivers include:

- › Major systemic safety failures as evidenced in the NSW Glenbrook and Waterfall Special Commissions of Inquiry;
- › Public dissatisfaction with government amid rising problems in the quality and performance of transport services;
- › Ageing workforce in the transport industry;
- › Emerging shortages in key skill specialist areas;
- › Budget stringency;
- › Low levels of industry innovation and research compared to international best practice; and
- › Public safety risks posed by the new security environment.

All of these factors necessitate a fundamental re-think by government and transport industry stakeholders regarding future directions. The overriding question is how to deliver more responsive and capable safety management to ensure public safety.

As a major policy and institutional initiative, the development of a safety capability building strategy is crucial for achieving the desired level of continuous improvement. Focused and ongoing workforce education and training are essential pre-requisites.

1.3 Education System Constraints

Profiles are at Appendices 6.3 to 6.6 to illustrate the types of issues that the pathway project is likely to face in each educational sector.

One major area is the cross-sectoral issues within the education system. Poor structural linkages exist between school, vocational and higher educational sectors that adversely impact on learning and training development outcomes. For transport safety in particular, there is no comprehensively focused program or curriculum.

A range of cross-sectoral issues need to be addressed before unfettered pathway progression can be made possible. Commonly cited issues of concern regarding transition linkages include the following:

- **Schooling to VET** (transition outcomes from different curriculum streams in school, program credit recognition, work placement, joint delivery, the value of careers education and guidance).
- **Higher Education to VET** (employment value of university degrees, evaluating cross-sectoral programs, industry relevance of vocational based courses).
- **VET to Higher Education** (program credit recognition and transfer, seamlessness, access).

These issues are complex, considerable and cannot be underestimated. Seamless transition is further complicated by the variations between the educational systems in each State and Territory.

Another issue relates to curriculum development and approval. Using NSW as an example, these are statutory functions of the Board of Studies. Procedurally, the required development and evaluation tasks of any proposed curriculum change are intricate and very lengthy.

Taken as a whole, the range of complexities pose major challenges for any proposal that involves restructuring or modifying current curriculum within the educational sectors and associated credit recognition between the sectors. The management of change would be clearly problematic.

1.4 Impact of National Initiatives

The likely impact of Commonwealth-initiated educational reforms should not be overlooked.

One recent reform is the Australian Technical Colleges Initiative. Under this plan, the Commonwealth has committed \$289M over four years to establish 24 Australian Technical Colleges providing high quality tuition in both academic and vocational education for students in Years 11 and 12.

The Colleges will be located in regions suffering skills shortages, with high rates of youth unemployment, and where support can be drawn from a significant industry base. The first of these Colleges will commence in 2006, with industry being a key participant in their endorsement and operation.

A basic risk faced by the new institutions is that they may evolve into trade-limited, training "silos". On the other hand, they could act as a force multiplier in assisting the development of industry endorsed pathways. For example, the new College system and its approach to nationally recognised qualifications may have considerable flow-on effects in terms of strengthening the linkages between the educational sectors for particular programs.

The degree of cross-sectoral improvement will certainly become clearer as implementation progresses.

1.5 Other Challenges

In addition to the issues faced in and between the educational sectors, there are other challenges for the pathway project. These are extensive and can be summarised as:

- **Structural e.g.**
 - › Institutional silos
 - › Aligning with industry needs and regulatory performance
- **Funding e.g.**
 - › Budget constraints
 - › Alternative sources
- **Bureaucratic e.g.**
 - › Government regulatory issues (statutory requirements vs industry capability)
- **Political e.g.**
 - › Industrial issues (new course vs available teaching time)
 - › Impact of national initiatives (Australian Technical Colleges program)
- **Internal e.g.**
 - › Project planning, consultation and reporting.

Certainty of funding and trained teaching staff are critical to success. In the school sector for example, a proposal to introduce a stand-alone subject area is fraught with major problems, the most significant being the direct competition it would create with other areas of the curriculum for limited resources and teaching time.

Structured coordination and collaboration of stakeholders are also crucial. The suggested processes for stakeholder participation are outlined in Appendix 6.2 dealing with the evaluation mechanisms for each educational sector. A more strategic proposal for stakeholder collaboration is presented at Section 5.

2.0 INFLUENCE OF THE WATERFALL SCOI

This Section considers the Waterfall SCOI as an authoritative guide in relation to the parameters of what a new learning pathway in transport safety management may require. The scope and direction of the SCOI's recommendations are viewed as directly relevant to the safety performance of all transport modes.

2.1 Background

Out of all the influencing factors, the Waterfall SCOI is seen as establishing the case for singling out transport safety management as an educational and vocational priority.

By way of background, the major systemic safety failures that the NSW rail industry has endured over recent years were the subject of exhaustive judicial inquiries, namely the Glenbrook and Waterfall SCOs. These Inquiries presented wide-ranging reform packages covering all aspects of safety.

The particular strength of the Waterfall SCOI lay in its core staff having conducted the earlier Glenbrook SCOI. As a result, substantial policy and technical expertise in rail safety had been acquired and demonstrated over the last five years in their investigations of both accidents.

2.2 Safety Qualification and Competency Priorities

In the Waterfall SCOI, profound weaknesses were identified in the management of safety by the SRA and RailCorp. The SCOI's Safety Management Systems Expert Panel (SMSEP) identified a range of areas with significant management deficiencies. These areas included managerial competency, formal qualifications, training, risk management, human factors, emergency preparedness, and asset management and maintenance.

The scope of these deficiencies was evidenced in the SCOI's recommendations. For example, the SCOI recommended that RailCorp should:

- **Qualifications and Accountability**
 - › *Rec. 102:* Make it a condition of employment that all Level 2 Managers have or obtain a formal qualification in system safety management.
 - › *Rec. 103:* Establish clear safety accountability statements and reporting lines for all management positions.
- **Safety Management**
 - › *Rec. 122:* Establish an integrated safety management system which includes (the relevant segments of the recommendation are given below):
 - Formal performance management system, incorporating measurable safety accountabilities and responsibilities for each managerial position.
 - Defined safety accountability statements for senior management.
 - Criteria for recruitment and promotion of management staff, including safety management qualifications, experience and expertise.
 - Development of training systems based upon training needs analysis.
- **Competency Review and Training**
 - › *Rec. 106:* (The Board) Require a full review of the safety competence of RailCorp managers to ensure that each has the ability to bring about the recommended safety reforms applicable to his or her position.
 - › *Rec. 107:* Ensure that, where the safety competency of any manager is deficient, such manager is required to undertake professional development courses to raise his or her safety competency level to an adequate standard.

The task of implementing the SCOI's recommendations in these areas will be neither a speedy nor a simple endeavour. As recognised by the SCOI, the complexity associated with devising and introducing an integrated safety management system is a pervasive issue. Organisationally, substantial work is essential. For example, during the transitional phase, the relevant safety procedures need to be thoroughly tested, evaluated and verified as to their adequacy before integration into the overall business activities.

Such planning and implementation tasks are not helped by the fact that there is no formal educational qualifying program in place, at either State or national levels, which is capable of providing the type of multi-disciplinary learning and skills training that were advocated by the SCOI.

The pathway strategy would be of considerable benefit to RailCorp and ITSRR as they progress with implementing the SCOI's recommendations.

2.3 Relevance to Other Transport Modes

It is fair to say that the Waterfall SCOI's Final Report presented the safety culture and integrated management attributes that, in varying degrees, all transport modes would seek to achieve. In this context, the value of the SCOI is seen as being two-fold:

- An authoritative guide to the multi-disciplinary operational tasks, management interrelationships and change framework that are necessary for continuous safety improvement in all transport modes; and
- A critical baseline for assessing the parameters of what a new learning pathway may require in terms of whole-of-industry and regulatory compliance content.

The SMSEP's review elements are a constructive starting point when looking at what other transport modes may require for safety management.

Details of the SMSEP's 29 elements and their rationale are at Appendix 6.7. They cover such areas as Management Commitment, Policy and Control, Training and Education, Hazard Identification and Risk Management, Incident/Accident Reporting System, Analysis and Monitoring, Change Management, Contracted Goods and Services, Management and Staff Recruitment, Human Factors and the System Safety Program Plan.

The SMSEP applied elements that were based on what had been identified as characteristic of organisations with integrated safety management systems. Specifically, the airline industry was applied as a model in identifying the bulk of the 29 basic elements against which to assess the adequacy of activities undertaken by the SRA and RailCorp. The airline industry model reflected the application of standards for very mature safety management systems. The other elements were derived from good safety management practices in high hazard industries other than the airline industry and which were applicable to the rail industry.

The fundamental importance of the SMSEP elements in safety management was made clear by the SCOI when it recommended that:

- *Rec. 123:* RailCorp should establish a safety management system containing the 29 elements identified in the SMSEP report.
- *Rec. 124:* ITSRR should ensure that RailCorp establishes a safety management system containing the 29 elements identified in the SMSEP report, and ensure the ongoing monitoring and improvement of the safety management system established.

The scope and direction of these recommendations are considered to have direct relevance to the safety performance of all transport modes. However, an important caveat should be borne in mind. When considering the SMSEP's approach to integration, the SCOI made it clear that organisations displaying all the SMSEP elements and their full and seamless integration within business operations are likely to be very rare. For the SCOI, a useful measure is to determine the extent to which a particular organisation falls short of this ideal. It is in this context that the SMSEP elements can be used as a critical baseline for assessing pathway learning streams. The next Section provides a closer look at this aspect.

3.0 DEVISING INDICATIVE LEARNING STREAMS

This Section looks at the Waterfall SMSEP elements as providing a critical baseline for discussion in relation to the development of indicative learning streams for transport safety management. Integral to this is the linking of the theoretical to the practical through course content including “at work” components.

3.1 Waterfall SMSEP Elements as a Baseline

Considerable value can be gained by using the SCOI’s approach to an integrated safety management system as a basis for discussion regarding indicative learning streams. Compatibility of these streams with the different transport modes is an important part of this development work.

It should be emphasised that, without drawing on an independently-derived baseline as that represented by the SMSEP elements, the process of developing key learning streams would likely to be susceptible to short term considerations and not longer term systemic ones. A reality check is nevertheless important. As indicated in Section 2, the SCOI agreed with the proposition that organisations displaying the entirety of the SMSEP elements and their full and seamless integration within overall business activities are likely to be very rare.

In line with the SCOI’s view, the SMSEP elements are considered for the purposes of this paper a critical baseline for assessing the multi-disciplinary operational tasks, management interrelationships and change framework that are necessary for continuous safety improvement in all transport modes.

Appendix 6.7 seeks to provide a comparison of the SMSEP elements, their rationale, how they could be applied as learning streams or subsets, and their bearing on different modes. Without seeking to over-generalise, this comparison goes some way towards establishing the multi-disciplinary characteristics and operational relevance of areas which could be further considered as required learning streams. Using this comparison, the same degree of multi-disciplinary requirements and relevance are indicated for the different transport modes.

3.2 Indicative Framework

Appendix 6.8, drawing on the above comparative work, outlines an indicative framework for the pathway’s learning streams and their subsets. This framework is put forward to guide further discussion and evaluation by the TALC and stakeholders.

The indicative learning framework is summarised below.

- **Safety Management Systems**
Directly relevant to all modes. Subsets could cover:
 - › Framework e.g.
 - Organisational Integration
 - Public Safety/OH&S Relationship
 - › Governance and Accountability
 - › Risk and Processes
 - › Safety Controls and Verification
 - › Emergency/ Disaster Plans e.g.
 - Practice Procedures and Evaluation
 - › Analysis and Monitoring e.g.
 - System Data and Estimation Processes
 - › Asset Management and Maintenance e.g.
 - Fit for Purpose
 - › “At Work ” Component
- **Managing Safety Culture**
Directly relevant to all modes, with industry-specific specialisation. Subsets could cover:
 - › Organisational Integration e.g.
 - Business Context
 - Safety Learning Organisation
 - Performance/OH&S Relationship
 - › Governance and Accountabilities
 - › Management and Staff Recruitment
 - › Training Systems
 - › Leadership and Innovation
 - › System Safety Program
 - › “At Work ” Component

DEVisING INDICATIVE LEARNING STREAMS

- **Risk Management**

Directly relevant to all modes, with industry-specific specialisation. Subsets could cover:

- › Framework and Tools
- › Hazard Identification and Controls
- › Emergency Preparedness
- › Organisational Linkages e.g.
 - Safety Management System, Investigations and Change Management
- › Plant/Fleet Safety
- › Documentation
- › Case Studies e.g.
 - Sector specific
- › “At Work ” Component

- **Regulatory Compliance**

Directly relevant to all modes, with industry-specific specialisation. Subsets could cover:

- › Framework e.g.
 - Rail, Passenger Transport and Maritime legislation
- › Regulatory Oversight Functions
- › Transport Provider Obligations and Responsibilities
- › Incident/Accident Reporting
- › Documentation
- › Case Studies e.g.
 - Sector specific
- › “At Work ” Component

- **Project and Contract Management**

Directly relevant to all modes. Subsets could cover:

- › Safety Assessments and Controls e.g.
 - Design and Development
 - Contracted Goods and Services
 - Traceability of Goods and Services
 - Procurement Stages
- › Hazard Identification and Risk Management
- › Review, Assessment and Evaluation
- › Documentation
- › Ethics e.g.
 - Codes of Conduct, ICAC
- › “At Work ” Component

- **Investigations**

Directly relevant to all modes, with industry-specific specialisation. Subsets could cover:

- › Framework e.g.
 - Rail, Passenger Transport and Maritime legislation
- › Documentation
- › Analysis and Reporting
- › Risk Management Linkages
- › Audit
- › Compliance Programs
- › “At Work ” Component

- **Change Management**

Directly relevant to all modes, with industry-specific specialisation. Subsets could cover:

- › Management Responsibilities
- › Planning and Resources
- › Safety Assessments of Change e.g.
 - Processes, Personnel, Equipment and Organisation
- › Risk Management Linkages
- › Case Studies e.g.
 - Sector specific
- › “At Work ” Component

- **Human Factors**

Directly relevant to all modes, with industry-specific specialisation. Subsets could cover:

- › Human Performance in a System
- › Human and Technology Interfaces
- › Behavioural and Medical Competencies
- › Abnormal Event Scenarios
- › Resource Management
- › Fatigue Management
- › Case Studies e.g.
 - Sector specific
- › “At Work ” Component

3.3 Design Considerations

At face value, it is considered feasible to develop the proposed streams, in varying degrees and focus, as a structured curriculum across the different educational sectors. Similarly, the streams are considered to provide the framework of essential elements that the various transport modes would require in relation to safety management learning and qualifications. Flexibility of the streams is another important consideration in terms of allowing the capacity to specialise in mode specific areas.

As mentioned previously, the above learning stream framework is indicative rather than inclusive. It is designed primarily as a baseline from which to guide further discussion and evaluation by the TALC and stakeholders. Further discussion could assess, for example, how the framework aligns with the different operational tasks of the various modes, regulatory compliance requirements and management interrelationship processes and controls. To assist this process, evaluation mechanisms are set out in Appendix 6.2. A more strategic proposal dealing with pathway delivery is presented in Section 5.

Integral to the development of the proposed streams is the linking of the theoretical to the practical through course content including “at work” components.

This is not to suggest a one-dimensional approach to workplace learning. To give participants the technical acumen to be a good risk analyst or asset management specialist would be inadequate to the needs of an integrated safety management system. A more comprehensive understanding of managerial aspects of work life (even when the participant has no desire or expectation of being a manager) is considered necessary because it is only through a conceptual and practical knowledge of the constraints faced in an organisational context that better performance is possible.

Centring intellectual and practical energies on what does and what should be going on in an integrated management workplace is considered crucial to skilled safety performance.

4.0 POSSIBLE PATHWAY SCENARIOS

This Section proposes a number of pathway scenario designs for further consideration. Numerous alternative scenarios can be developed incorporating different combinations of learning priorities and delivery assumptions, but the scenarios outlined below are presented as “bookends” showing a range of possible outcomes.

4.1 Overview

Profiles of the pathway scenarios are at Appendices 6.9 to 6.12. While general in approach, these flow charts do seek to succinctly capture the various types of pathway sequences that could occur when moving through different educational sectors.

The scenarios cover various transitions, using NSW as the setting, with either the HSC or VET as the principal entry points. The scenarios are based on indicative learning streams that were outlined at Appendices 6.7 to 6.8, and incorporate the learning and skill requirements identified for each educational sector at Appendices 6.3 to 6.6.

In summary, the pathway sequences cover:

- › Schooling to VET;
- › Higher Education to VET; and
- › VET to Higher Education.

Certain assumptions underpin the scenario designs. Foremost is their treatment as “greenfields” opportunities made possible by stronger linkages and collaboration between the educational sectors and industry than is currently the case. To this extent, the scenarios are provisional and general in nature. Certainty of implementation funding and trained teaching staff are also assumed in the scenario designs.

4.2 Design Issues

The pathway design for each educational sector is predicated on the common objective to achieve nationally recognised qualifications in transport safety management. Striking the right balance between the theory and practice-driven elements is viewed as a major issue for further evaluation.

The proposals for each educational sector assume the success of certain key initial steps that would only be possible through stakeholder collaboration and partnership. For the Primary and Secondary School sectors, the major test would reside in the agreement of stakeholders to undertake a pilot program, the results of which would determine the next steps.

The VET and Higher Education scenarios are more complex, both in their development and implementation.

It is very easy to say that a completely new education and training curriculum will be targeted for introduction into these sectors. Given the scale of the implementation challenges outlined in Section 1, a carefully managed strategy is critical for success. To this end, the suggested Plan of Action at Section 5 includes a proposal for a consortium of industry, VET and higher education providers with the dual task of developing and delivering the new programs.

4.3 Scenario Profile

The basic features and processes that comprise the scenarios at Appendices 6.9 to 6.12 can be summarised as follows:

Primary Schools

- › Introduction of TALC's Transport and Logistics in Primary Schools Program within a Key Learning Area of the primary education curriculum in, say, Human Society and Its Environment.
- › Curriculum content to be project work based, and to include safety in transport.
- › Pilot Program to be the first step.

Secondary Schools

- › Introduction of Transport and Logistics in the secondary school curriculum through:

General Education

- Case studies for Stages 4 (Years 7-8), 5 (Years 9-10) and 6 (Years 11-12) in a Key Learning Area leading to the Higher School Certificate in, say, Geography (Years 7-10, Preliminary and HSC) or Personal Development, Health and Physical Education

VET in Schools

- Stand-alone Transport and Logistics VET course leading to the HSC and credit towards a nationally recognised VET qualification.
- › Proposed case studies and VET content to include transport safety management as adapted from consideration of the indicative learning streams framework outlined in this paper.
- › Pilot Programs for the proposed case studies and VET content to be the first step.

VET Sector

- › Introduction of Transport Safety Management as:
 - Subset in a Transport and Logistics AQF Certificate I to Advanced Diploma.
 - Subset in existing Transport/Safety related programs.
 - Stand-alone AQF Certificate I to Advanced Diploma, with credit recognition for higher education entry.
- › First step to involve investigating a possible consortium of industry, vocational and higher education providers to develop and deliver the new programs.

Higher Education

- › Introduction of Transport Safety Management as:
 - Subset in existing Transport/Safety related Degree and Diploma programs.
 - Subset in a Transport and Logistics Degree and Diploma program.
 - Stand-alone Transport Safety Management Degree and Diploma program.
- › First step to involve investigating a possible consortium of industry, vocational and higher education providers to develop and deliver the new programs.

5.0 PLAN OF ACTION – PROPOSED NEXT STEPS

For discussion purposes, this Section sets out proposals for a Plan of Action to advance the pathway project. The Plan is based on short and longer term tasks.

5.1 Proposals for Consideration

The critical factor for making the pathway project an achievable plan is to ensure that it is matched by proper planning, coordination, stakeholder collaboration and resourcing.

Stakeholder support is vital. This needs to be guided by the mutual endorsement of objectives, direction and funding sources. These are considered essential pre-requisites for a project of this calibre.

A suggested Plan of Action, based on short and longer term tasks, is set out below.

1. SHORT TERM TASKS

• *ITSRR Consultation and Participation*

- › Seek the Regulator's views and input regarding the proposals outlined in this paper including ITSRR participation in the consortium strategy outlined below.

• *Stakeholder Forum on Developing the Transport Safety Management Learning Pathway*

- › Convene a forum of key stakeholders to discuss and agree on strategies to advance the pathway project.

• *Brief the NSW Minister for Transport Services and the Minister for Education and Training*

- › Arrange a briefing of Ministers Watkins and Tebbutt regarding the pathway strategy, inter-agency responsibilities and key initial milestones.

2. SHORT TO MEDIUM TERM TASKS

• *Memorandum of Understanding on Pathway Evaluation and Delivery*

- › Propose and negotiate a Memorandum of Understanding between key stakeholders covering the following:

Primary School Sector

Endorse, as a strategic goal:

- › Proposed future introduction of TALC's Transport and Logistics in Primary Schools Program within a Key Learning Area of the primary education curriculum in, say, Human Society and Its Environment.
- › Curriculum content to be project work based, and to include safety in transport.

Endorse, as a short to medium term goal:

- › Introduction of a pilot program and necessary project management plan to test and evaluate the proposal's objectives, outcomes and next steps.
- › Funding of the pilot to be by industry through a partnership agreement with participating schools.

Secondary School Sector

Endorse, as a strategic goal:

- › Proposed introduction of Transport and Logistics in the secondary school curriculum through:

General Education:

- Case studies for Stages 4 (Years 7-8), 5 (Years 9-10) and 6 (Years 11-12) in a Key Learning Area leading to the Higher School Certificate in, say, Geography (Years 7-10, Preliminary and HSC) or Personal Development, Health and Physical Education.

VET in Schools:

- Stand-alone Transport and Logistics VET course leading to the HSC and credit towards a nationally recognised VET qualification.
- Proposed case studies and VET content to include transport safety management as adapted from consideration of the indicative learning streams framework outlined at Appendix 6.8 of this paper.

Endorse, as a short to medium term goal:

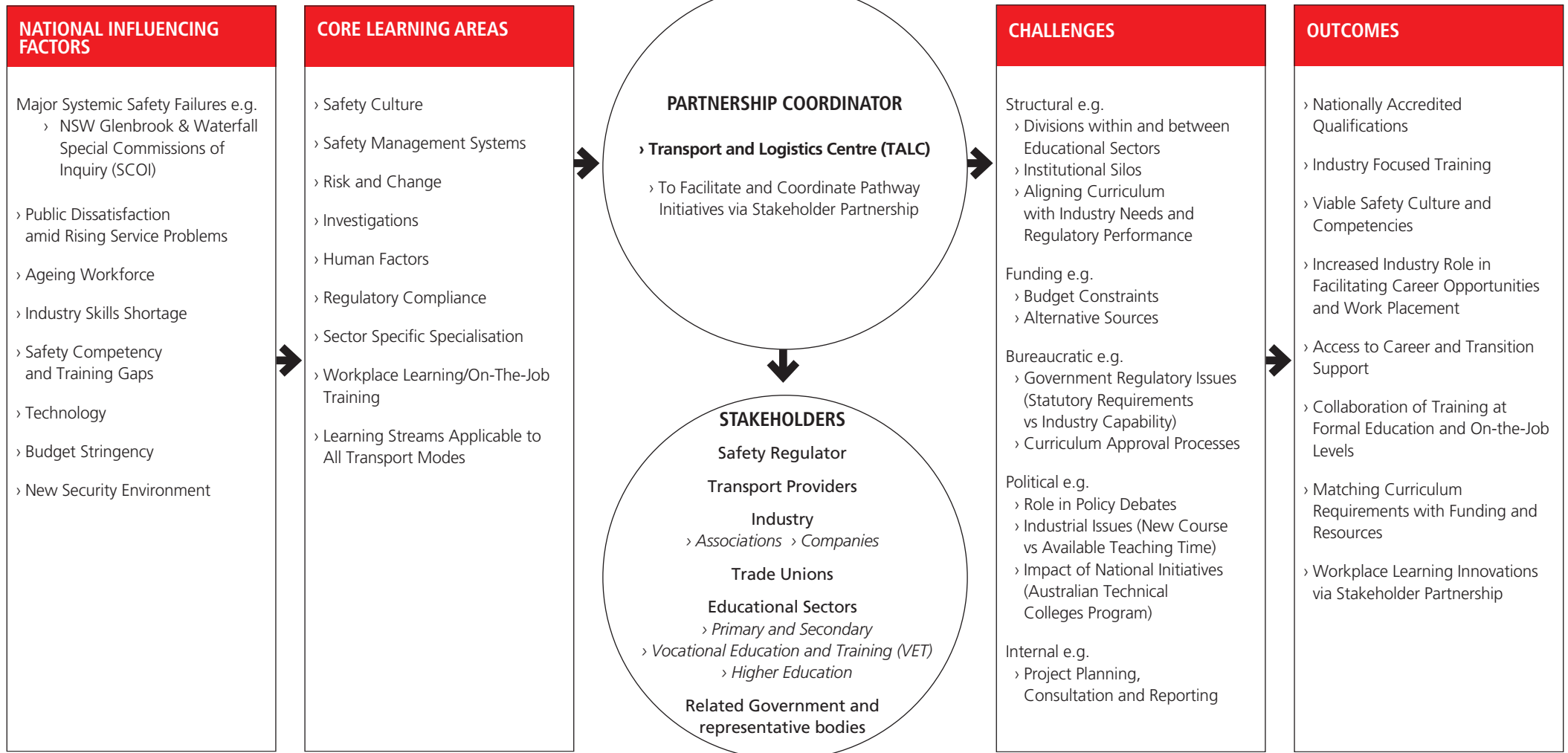
- › Introduction of a pilot program and necessary project management plan to test and evaluate the proposal's objectives, outcomes and next steps.
- › Funding of the pilot to be by industry through a partnership agreement with participating schools.
- **Planning and Coordination Mechanisms**
 - › Establish the necessary planning and coordination for the proposed pilot programs, using the evaluation mechanisms set out in Appendix 6.2 of this paper.

3. MEDIUM TO LONGER TERM TASKS

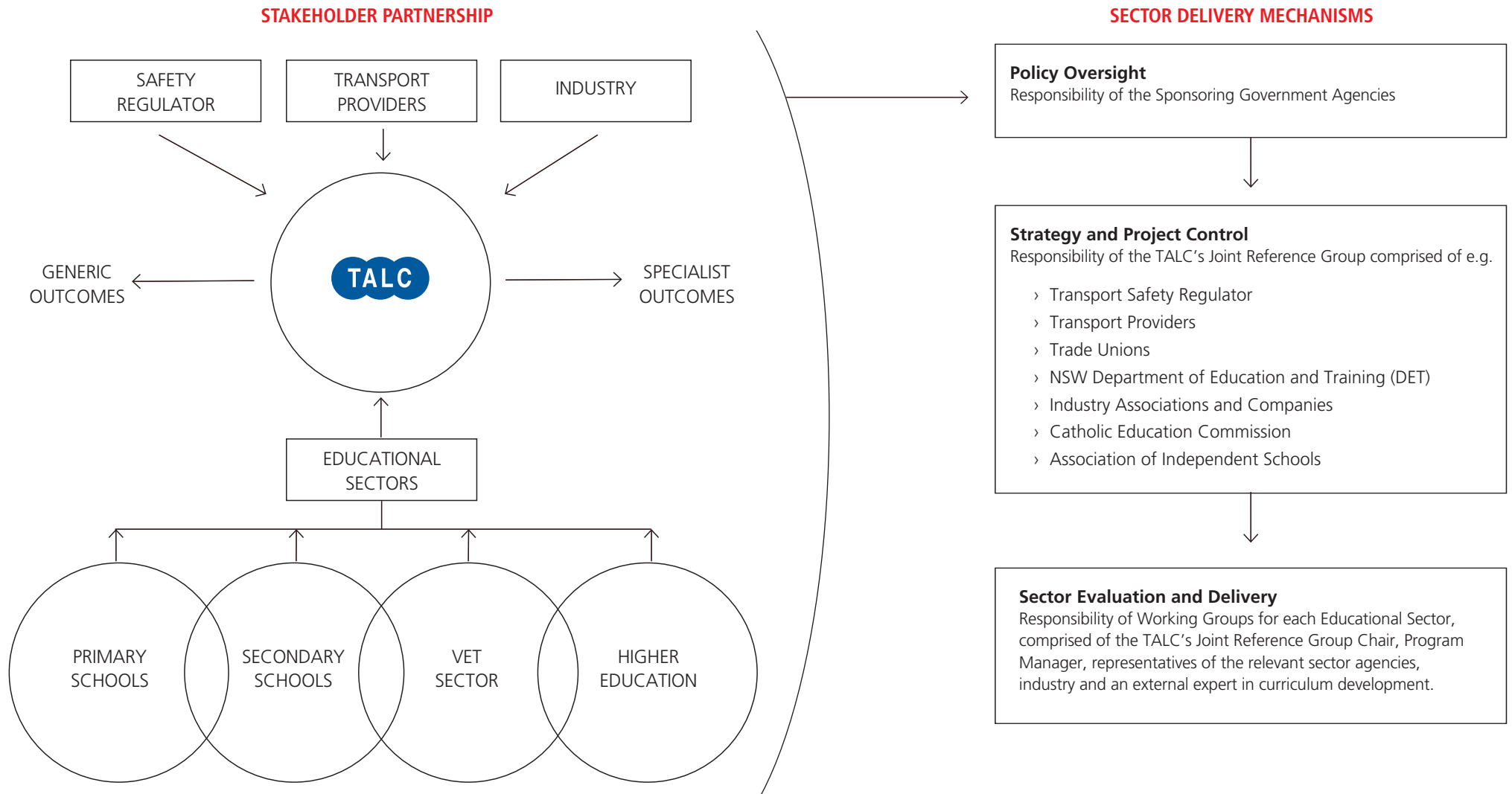
- **Industry, VET and Higher Education Consortium**

- › Investigate and formalise a consortium involving industry, VET and higher education providers that would be responsible for:
 - Curriculum development, delivery and funding.
 - Linkages between the VET and Higher Education programs.
 - Resolution of any other implementation barriers.
 - Implementation of industry endorsed initiatives.

CHANGE DRIVERS



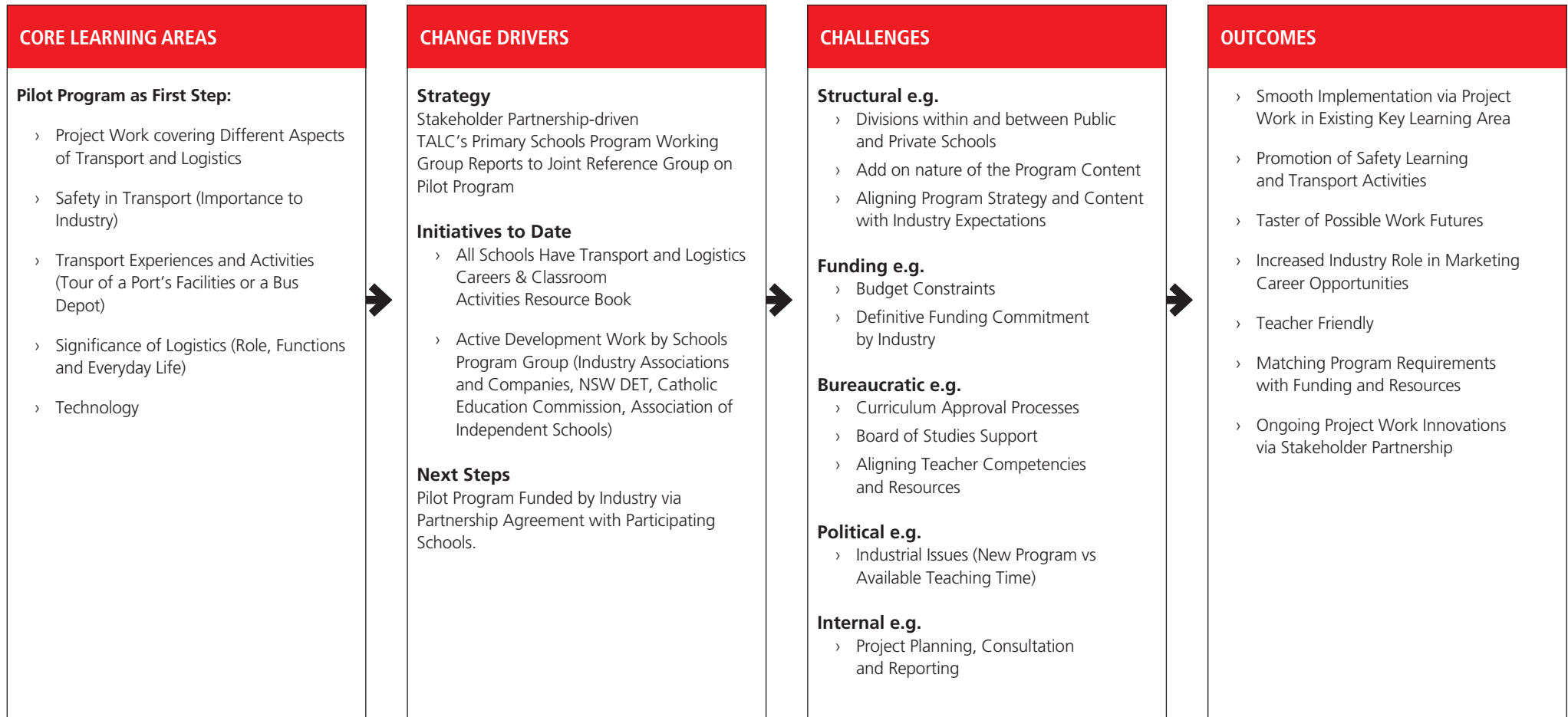
6.2 COLLABORATIVE MECHANISMS FOR EVALUATION



6.3 PRIMARY SCHOOLS - Evaluation Framework

Objective:

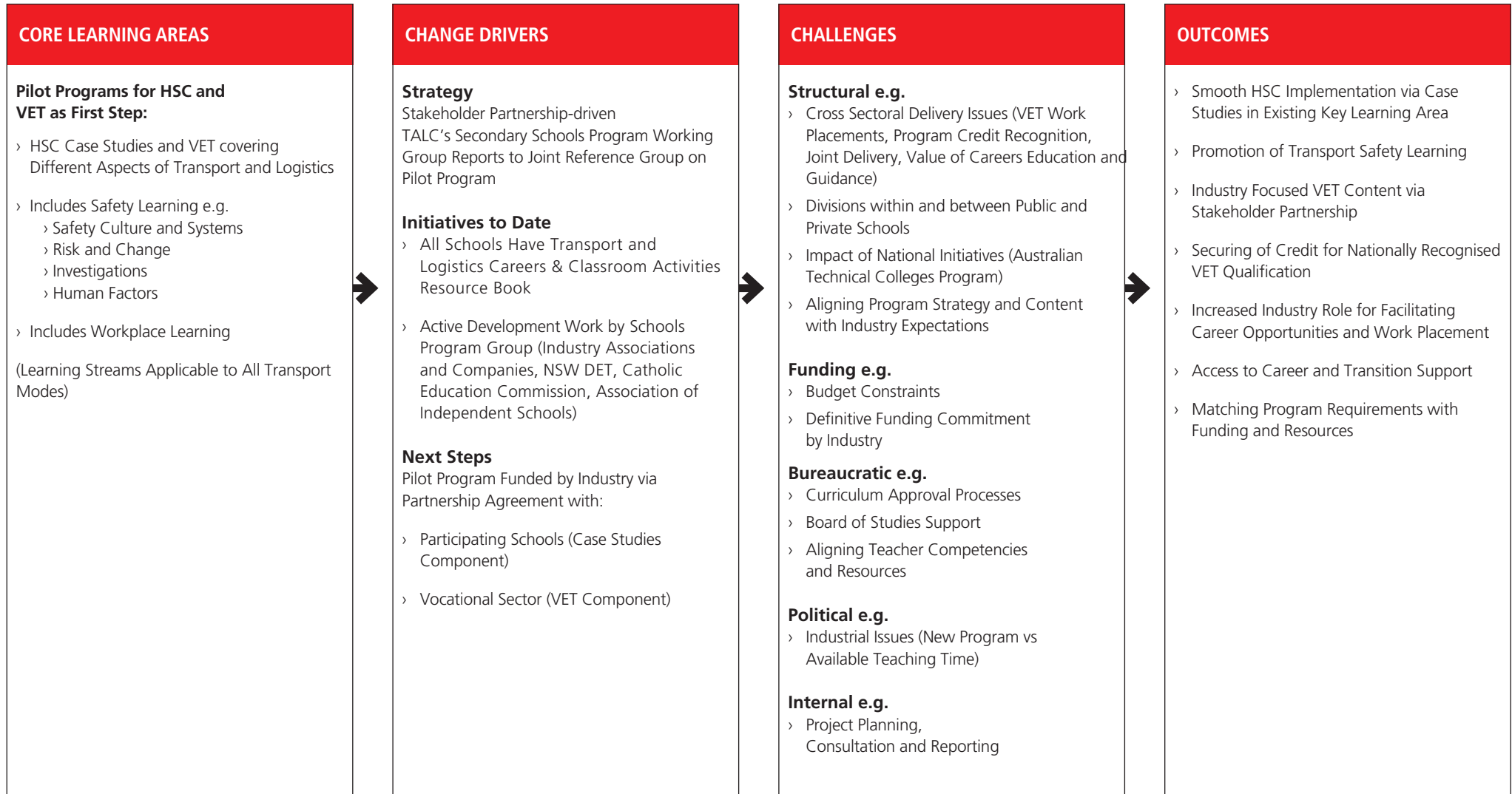
Develop, Assess and Coordinate the Introduction of Transport and Logistics within a Key Learning Area of the Primary Curriculum in, say, Human Society and Its Environment. Content to be Project Work Based, and include Safety in Transport. Pilot Program as First Step.



6.4 SECONDARY SCHOOLS - Evaluation Framework

Objective:

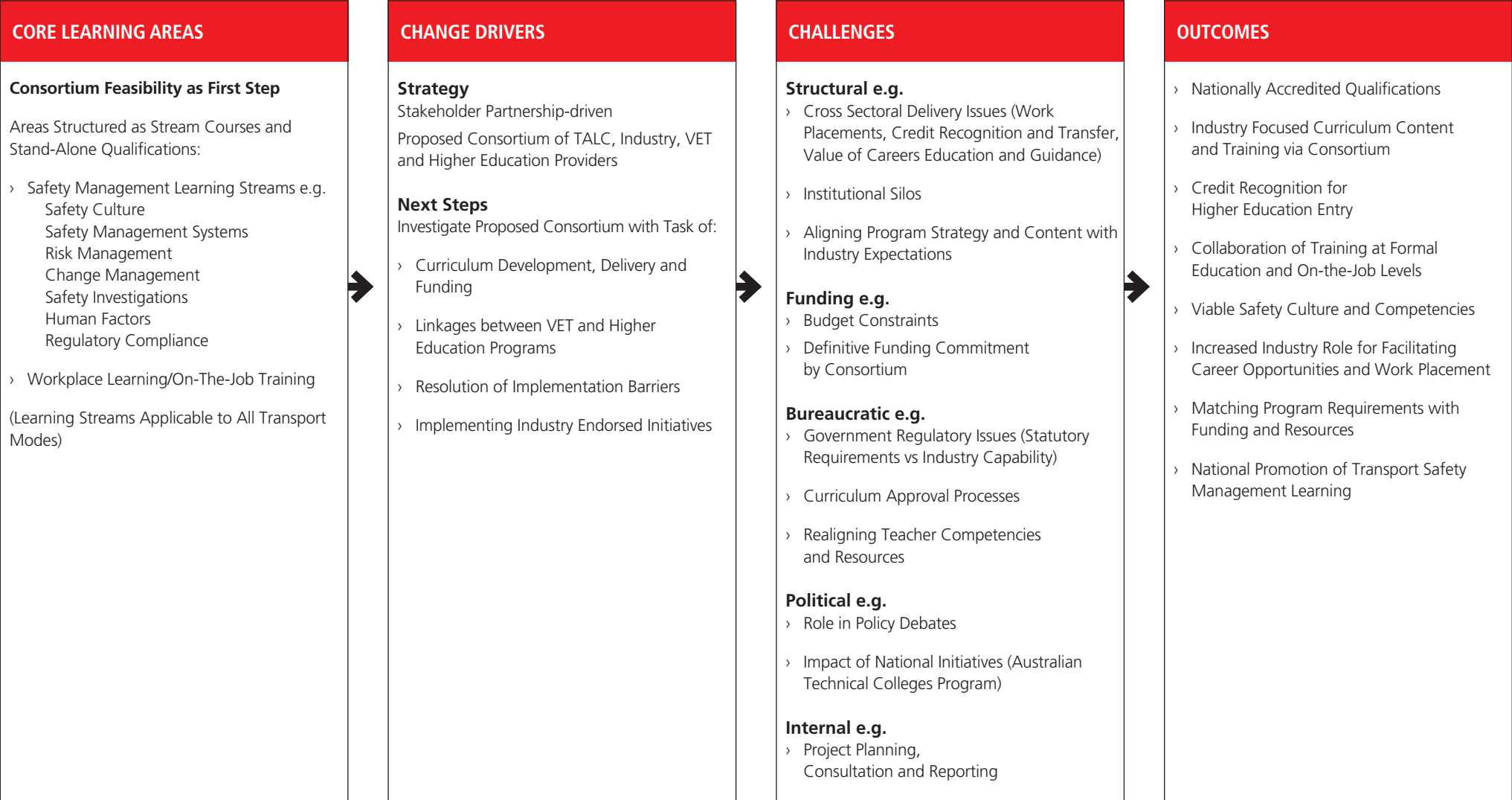
Develop, Assess and Coordinate the Introduction of Transport and Logistics in the Secondary School Curriculum both as Case Studies Subset in a Key Learning Area leading to the HSC and as Stand-Alone VET Course (details at Section 4.3). Case Studies and VET Content to include Transport Safety Management (adapted from consideration of the indicative learning streams at Appendix 6.8). Pilot Program as First Step.



6.5 VET SECTOR - Evaluation Framework

Objective:

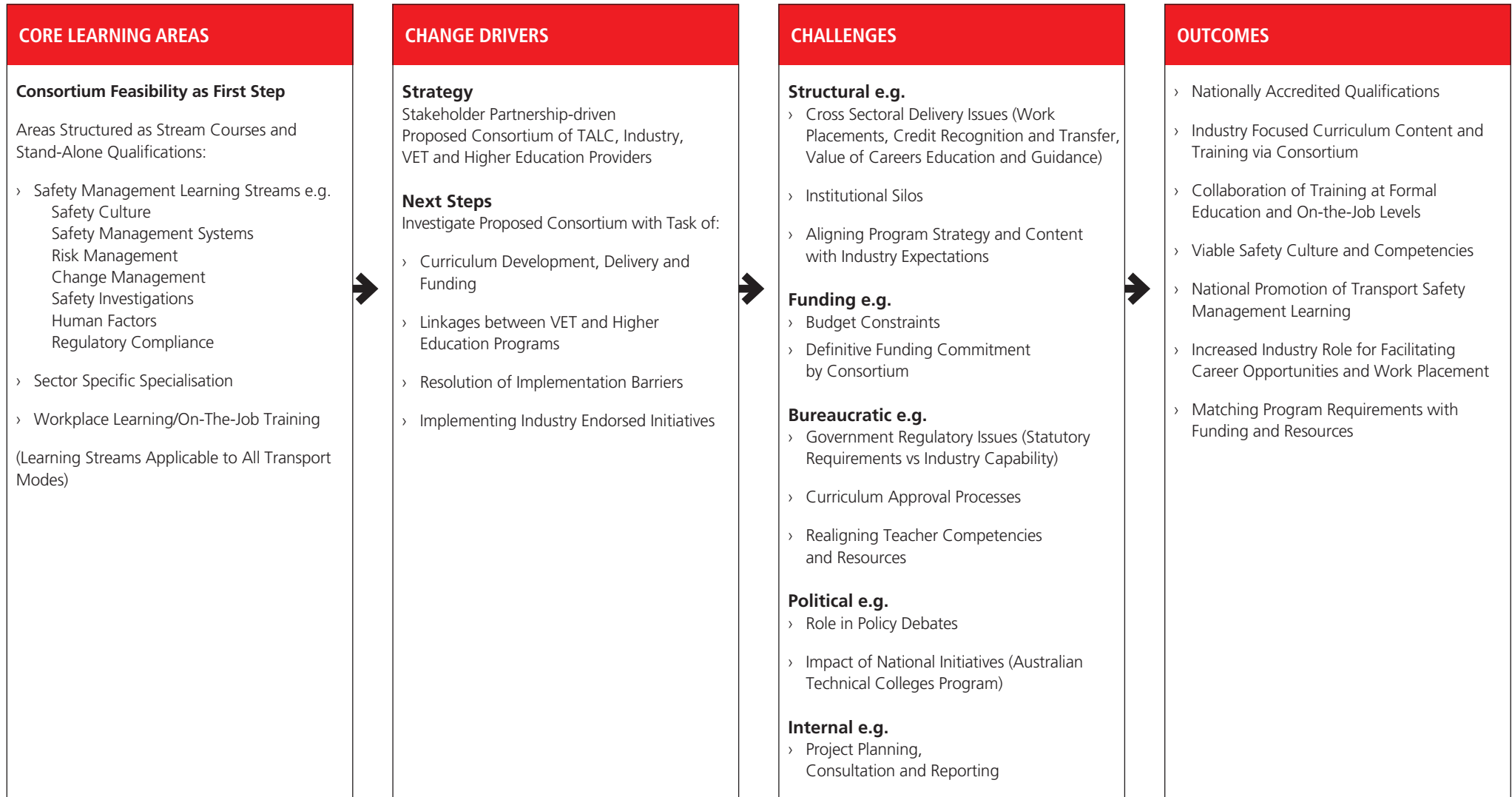
Introduction of Transport Safety Management as Subset in a Transport and Logistics AQF Certificate/Diploma Program, Subset in Existing Transport/Safety Related Programs, and as Stand-Alone AQF Certificate/Diploma Program, with Credit Recognition for Higher Education Entry. First Step to Investigate a Possible Consortium of Industry, VET and Higher Education Providers to Deliver Program.



6.6 HIGHER EDUCATION - Evaluation Framework

Objective:

Introduction of Transport Safety Management as Subset in Existing Transport/Safety Related University Diploma and Degree Courses, Subset in a Transport and Logistics Degree/Diploma Program, and as Stand-Alone Qualification from Graduate Certificate to Masters Level. First Step to Investigate a Possible Consortium of Industry, VET and Higher Education Providers to Deliver Program.



6.7 WATERFALL SMSEP ELEMENTS AS LEARNING STREAM BASELINE

SMSEP ELEMENT	RATIONALE	INDICATIVE LEARNING STREAM	RELEVANCE TO TRANSPORT MODES
1. Management Commitment	Management commitment and active participation is the cornerstone to all effective Safety Management Systems (SMS). If senior management do not actively participate, communicate, and reinforce the commitment to a safe outcome, it is unlikely that management processes and staff will promote and maintain good safety practice.	Integral to all streams. Proposed as part of subsets in all streams.	Integral to all modes
2. Policy and Control	Policies and objectives set out the intentions, the what and how, of the Board and Management for the organisation. They form the cornerstone of the requirements for an effective SMS. If policy and objectives are unclear then the implementation of the SMS may be ineffective.	Integral to all streams. Proposed as part of subsets in all streams.	Integral to all modes
3. Safety Representatives and Personnel	Important that sufficient and competent staff be dedicated to the safety management function. A good SMS will also give key safety managers access to senior leaders in the organisation.	Directly relevant to various streams. Proposed as part of subset in Managing Safety Culture stream.	Directly relevant to all modes
4. Safety Committee	Usually structured to consider safety issues at each level and across the organisation. Ensures oversight of the whole safety management function is both "bottom up and top down".	Directly relevant to various streams. Proposed as part of subset in Managing Safety Culture stream.	Directly relevant to all modes
5. Management Review	Imperative the organisation arrange effective management reviews of audits, reports and investigations to ensure appropriate safety validation and assurance of policy, procedures and actions at all levels.	Directly relevant to various streams. Proposed as part of subset in Managing Safety Culture, Risk Management and Investigations streams.	Directly relevant to all modes
6. Training and Education	Basis to ensure that staff are competent and adequately skilled to manage safety issues.	Directly relevant to various streams. Proposed as subset in Managing Safety Culture, and Change Management streams.	Directly relevant, with industry-specific specialisation.
7. Hazard Identification and Risk Management	Vital to system safety. Ineffective hazard identification will lead to untreated risks.	Integral to all streams. Proposed as Risk Management stream, with subsets in Safety Management Systems, Investigations and Change Management streams.	Integral, with industry-specific specialisation.

6.7 WATERFALL SMSEP ELEMENTS AS LEARNING STREAM BASELINE *continued*

SMSEP ELEMENT	RATIONALE	INDICATIVE LEARNING STREAM	RELEVANCE TO TRANSPORT MODES
8. Document Control	Strong document control process that clearly indicates the status, purpose and scope of a document is required in an organisation where new procedures, system modifications and new procurements can effect a safe outcome.	Directly relevant to various streams. Proposed as subset in Safety Management Systems, Risk Management, Regulatory Compliance, Investigations, and Project and Contract Management streams.	Directly relevant to all modes
9. Record Control	Control of key safety records covering equipment, people and processes is essential to ensuring the effectiveness of current and previous processes.	Directly relevant to various streams. Proposed as part of subset in Safety Management Systems, Risk Management, Regulatory Compliance, Investigations, and Project and Contract Management streams.	Directly relevant to all modes
10. Internal Audit	Provide the Board and management with the feedback on the performance of the SMS. Structured to address key safety hazards across the organisation and conducted on a periodic basis.	Directly relevant to various streams. Proposed as subset in Risk Management and Investigations streams.	Directly relevant, with industry-specific specialisation.
11. Incident/Accident Reporting System	Clear and transparent safety incident reporting system is important in promoting continuous safety improvement. Reports incidents and allows analysis, identifies trends and monitors the effectiveness of controls.	Directly relevant to various streams. Proposed as subset in Risk Management, Regulatory Compliance and Investigations streams.	Directly relevant, with industry-specific specialisation.
12. Incident/Accident Investigation	Systematic safety investigation of accidents and incidents is part of a thorough SMS. An organisation should learn from incident investigations, and their results enhance safety.	Directly relevant to various streams. Proposed as subset in Risk Management and Investigations streams.	Directly relevant, with industry-specific specialisation.
13. Analysis and Monitoring	Understanding safety trends is an important measure of a SMS's effectiveness. Statistical data analysis and trend monitoring can lead to improvements of the SMS.	Directly relevant to various streams. Proposed as subset in Safety Management Systems, Risk Management and Investigations streams.	Directly relevant, with industry-specific specialisation.
14. Emergency Response Procedures	A proactive SMS prepares emergency response processes to minimise the impact of incidents.	Directly relevant to various streams. Proposed as subset in Safety Management Systems, and Risk Management streams.	Directly relevant, with industry-specific specialisation.
15. Change Management	Change management policy and procedures ensures safety is considered when changes to processes, personnel, equipment and the organisation are planned.	Directly relevant to various streams. Proposed as Change Management stream, with subset in Risk Management stream.	Directly relevant, with industry-specific specialisation.

6.7 WATERFALL SMSEP ELEMENTS AS LEARNING STREAM BASELINE *continued*

SMSEP ELEMENT	RATIONALE	INDICATIVE LEARNING STREAM	RELEVANCE TO TRANSPORT MODES
16. System for Managing Requirements and Changes	Identifying and managing safety requirements and changes to requirements is important to ensure key safety controls are kept in place and remain effective.	Directly relevant to various streams. Proposed as part of subset in Risk Management, Regulatory Compliance and Change Management streams.	Directly relevant, with industry-specific specialisation.
17. Customer Feedback	Important to identifying key safety issues from the customer's perspective	Directly relevant to various streams. Proposed as part of subset in Safety Management Systems stream.	Directly relevant to all modes
18. Contracted Goods and Services	Must have, as part of the procurement and contract management process, identification of safety requirements.	Directly relevant to various streams. Proposed as subset in Project and Contract Management and part of subset in Risk Management stream.	Directly relevant to all modes
19. Traceability of Goods and Services	Knowing the source and supplier of goods and services is particularly important in respect of safety critical equipment. If goods and services do not meet appropriate safety standards, or are not adequately controlled for quality, then the buyer may be introducing unknown new hazards to the system.	Directly relevant to various streams. Proposed as subset in Project and Contract Management and part of subset in Risk Management stream.	Directly relevant to all modes
20. Measuring Equipment and Calibration System	Not assessed due to time constraints on the SMSEP.	Advice required from operators and regulator. Possible part of subset in Safety Management Systems and Risk Management streams.	Industry-specific specialisation where applicable.
21. Procurement of Goods and Services	System safety requirements must be an integral part of the procurement process, from the earliest stages of concept definition, through to equipment acquisition, operations, and finally disposal.	Directly relevant to various streams. Proposed as subset in Project and Contract Management and part of subset in Risk Management stream.	Directly relevant to all modes
22. Equipment Maintenance	Safety critical equipment must be identified, properly maintained and tested. If this equipment is not maintained in a fit for purpose condition then important risk controls may not operate as required.	Directly relevant to various streams. Proposed as subset in Safety Management Systems and part of subset in Risk Management stream.	Directly relevant, with industry-specific specialisation.
23. Design and Development	Safety analysis and oversight processes as part of the design and development of equipment and systems ensure safety requirements are considered and effective.	Relevant to various streams. Proposed as part of subset in Safety Management Systems, Risk Management and Project and Contract Management streams.	Directly relevant, with industry-specific specialisation.

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6.7 WATERFALL SMSEP ELEMENTS AS LEARNING STREAM BASELINE *continued*

SMSEP ELEMENT	RATIONALE	INDICATIVE LEARNING STREAM	RELEVANCE TO TRANSPORT MODES
24. Management and Staff Recruitment	Recruitment of management and staff must adequately assess the safety attitudes, qualifications, training and experience requirements of potential applicants.	Directly relevant to various streams. Proposed as subset in Managing Safety Culture, and Change Management streams.	Directly relevant, with industry-specific specialisation.
25. Medical issues	Ability to perform safety critical tasks efficiently and effectively may depend on staff physical and mental abilities and medical condition. These need to be identified and assessed at recruitment and then assessed periodically to ensure continued ability and capability, especially for safety critical roles.	Directly relevant to various streams. Proposed as subset in Human Factors stream.	Directly relevant, with industry-specific specialisation.
26. Human Factors	Consideration of humans as an element of a complex system requires analysis and study of human capabilities, limitations, and behaviors. Integrating this information into the design of systems to enhance the safety, performance and general well being of system operators is critical for effective system safety.	Directly relevant to various streams. Proposed as Human Factors stream, with part of subset in Safety Management Systems and Change Management streams.	Directly relevant, with industry-specific specialisation.
27. Safety Organisation	Management requirements for safety are achieved by identifying the responsibilities, authorities and accountabilities for all aspects of safety management including engineering, people, process and organisational management at all levels. Provides the necessary capacity to implement an effective system safety program.	Integral to all streams. Proposed as part of subset in Safety Management Systems, Managing Safety Culture, and Change Management streams.	Integral, with industry-specific specialisation.
28. Safety Awareness	SMS should continually reinforce safety awareness in all staff and empowers them to effect change.	Integral to all streams. Proposed as part of subset in Safety Management Systems, Managing Safety Culture, and Risk Management streams.	Integral
29. System Safety Program Plan	System safety program is normally documented and controlled using a detailed plan supported by dedicated project resources and an effective communications strategy.	Integral to all streams. Proposed as part of subset in Safety Management Systems, Managing Safety Culture, and Risk Management streams.	Integral

6.8 INDICATIVE LEARNING STREAMS AND SUBSETS

PROPOSED STREAM	PROPOSED SUBSET	RELEVANCE TO TRANSPORT MODES
Safety Management Systems	<ul style="list-style-type: none"> › Framework e.g. <ul style="list-style-type: none"> › Organisational Integration › Public Safety/OH&S Relationship › Governance and Accountability › Risk and Processes › Safety Controls and Verification › Emergency/Disaster Plans e.g. <ul style="list-style-type: none"> › Practice Procedures and Evaluation › Analysis and Monitoring e.g. <ul style="list-style-type: none"> › System data and Estimation Processes › Asset Management and Maintenance e.g. <ul style="list-style-type: none"> › Fit for Purpose › Documentation <ul style="list-style-type: none"> “At Work” Component 	Directly relevant to all modes
Managing Safety Culture	<ul style="list-style-type: none"> › Organisational Integration e.g. <ul style="list-style-type: none"> › Business Context › Safety Learning Organisation › Performance/OH&S Relationship › Governance and Accountabilities › Management and Staff Recruitment › Training Systems › Leadership and Innovation › System Safety Program › “At Work” Component 	Directly relevant, with industry-specific specialisation.
Risk Management	<ul style="list-style-type: none"> › Framework and Tools › Hazard Identification and Controls › Emergency Preparedness › Organisational Linkages e.g. <ul style="list-style-type: none"> › Safety Management System, Investigations and Change Management › Plant/Fleet Safety › Documentation › Case Studies e.g. <ul style="list-style-type: none"> › Sector specific › “At Work” Component 	Directly relevant, with industry-specific specialisation

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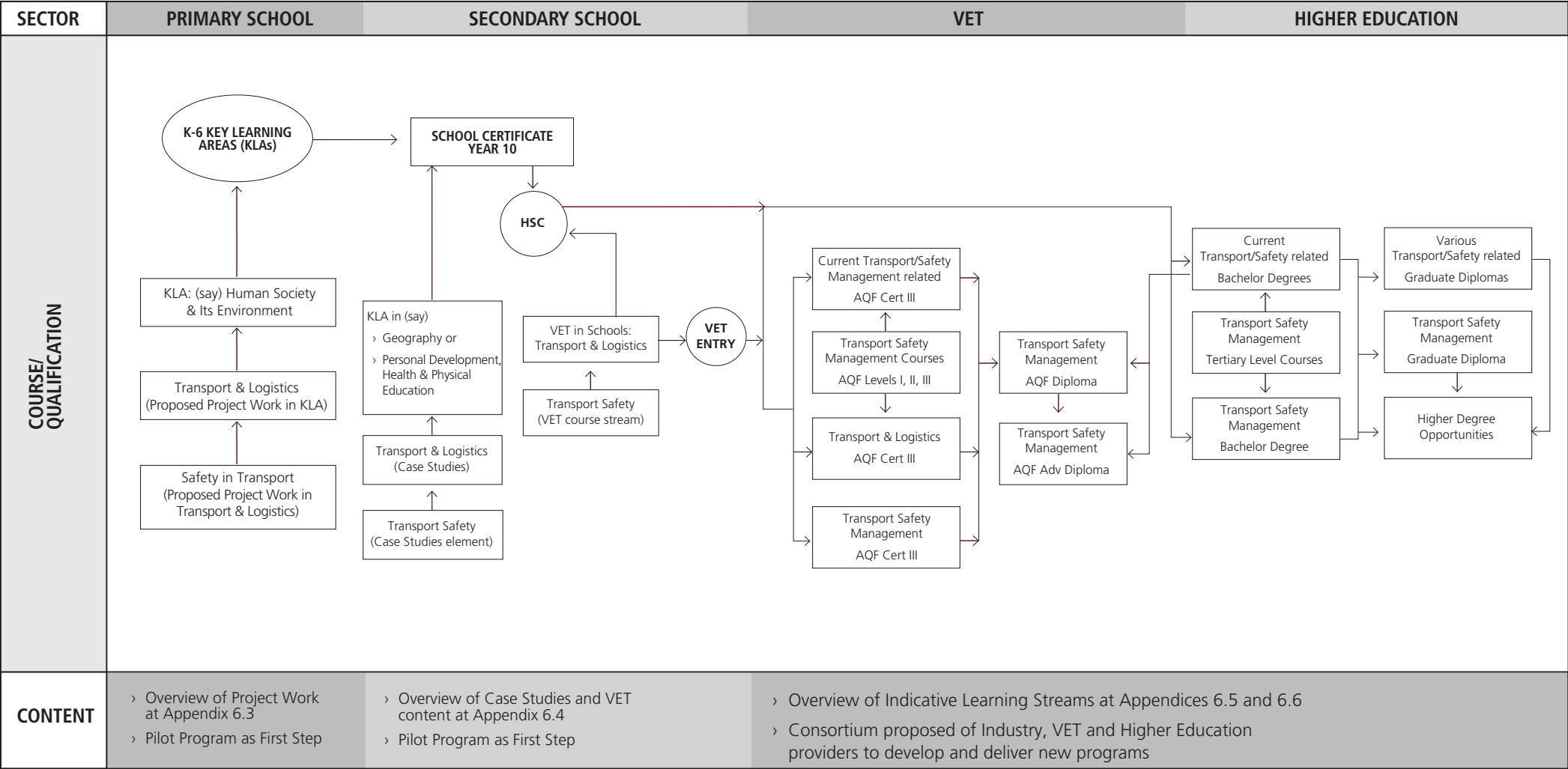
6.8 INDICATIVE LEARNING STREAMS AND SUBSETS (continued)

PROPOSED STREAM	PROPOSED SUBSET	RELEVANCE TO TRANSPORT MODES
Regulatory Compliance	<ul style="list-style-type: none"> › Framework e.g. <ul style="list-style-type: none"> › Rail, Passenger Transport and Maritime legislation › Regulatory Oversight Functions › Transport Provider Obligations and Responsibilities › Incident/Accident Reporting › Documentation › Case Studies e.g. <ul style="list-style-type: none"> › Sector specific › “At Work” Component 	Directly relevant, with industry-specific specialisation
Project And Contract Management	<ul style="list-style-type: none"> › Safety Assessments and Controls e.g. <ul style="list-style-type: none"> › Design and Development › Contracted Goods and Services › Traceability of Goods and Services › Procurement Stages › Hazard Identification and Risk Management › Review, Assessment and Evaluation › Documentation › Ethics e.g. <ul style="list-style-type: none"> › Codes of Conduct, ICAC › “At Work” Component 	Directly relevant to all modes
Investigations	<ul style="list-style-type: none"> › Framework e.g. <ul style="list-style-type: none"> › Rail, Passenger Transport and Maritime legislation › Documentation › Analysis and Reporting › Risk Management Linkages › Audit › Compliance Programs › “At Work” Component 	Directly relevant, with industry-specific specialisation
Change Management	<ul style="list-style-type: none"> › Management Responsibilities › Planning and Resources › Safety Assessments of Change e.g. <ul style="list-style-type: none"> › Processes, Personnel, Equipment and Organisation › Risk Management Linkages › Case Studies e.g. <ul style="list-style-type: none"> › Sector specific › “At Work” Component 	Directly relevant, with industry-specific specialisation

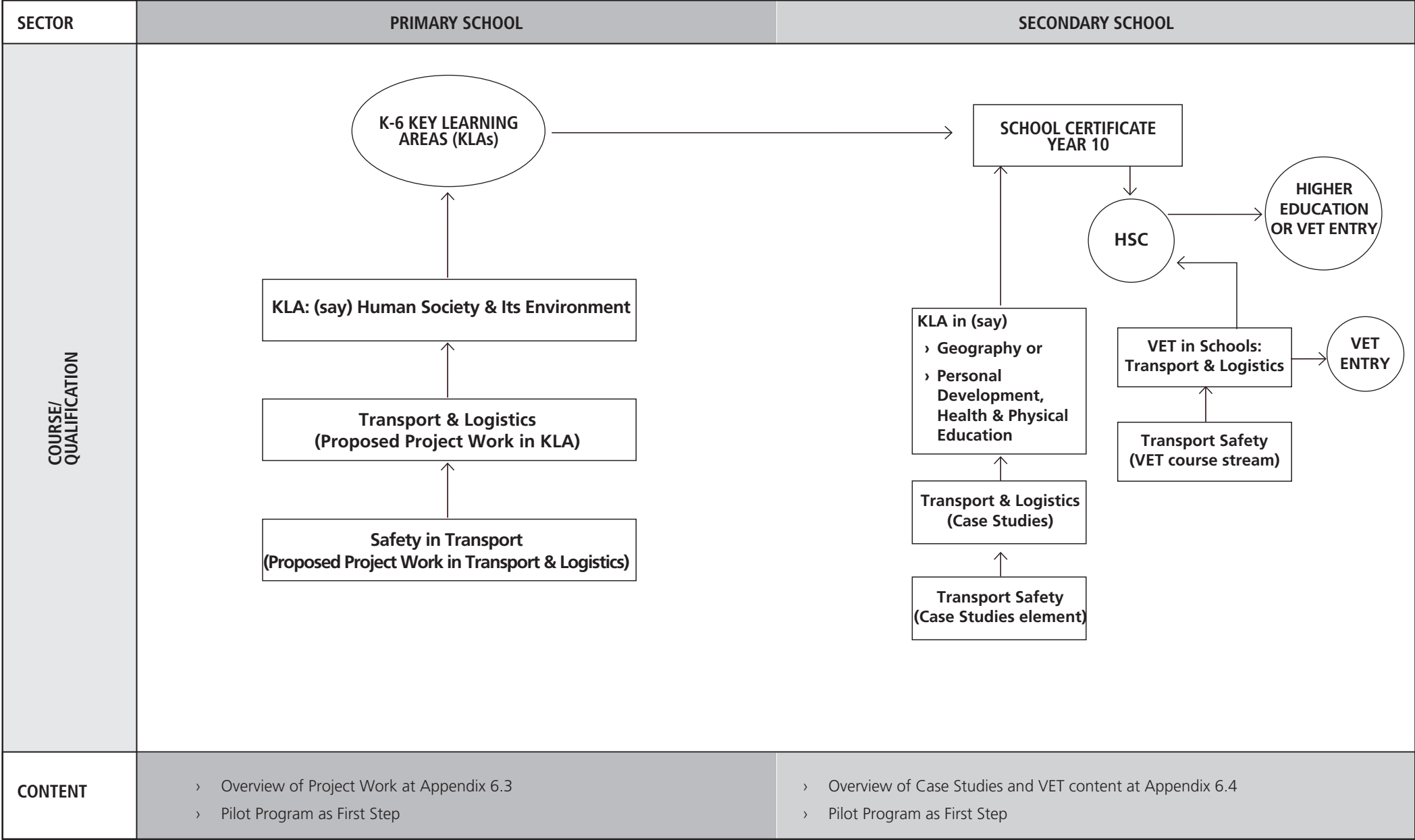
6.8 INDICATIVE LEARNING STREAMS AND SUBSETS (continued)

PROPOSED STREAM	PROPOSED SUBSET	RELEVANCE TO TRANSPORT MODES
Human Factors	<ul style="list-style-type: none">› Human Performance in a System› Human and Technology Interfaces› Behavioural and Medical Competencies› Abnormal Event Scenarios› Resource Management› Fatigue Management› Case Studies e.g.<ul style="list-style-type: none">› Sector specific“At Work” Component	Directly relevant, with industry-specific specialisation

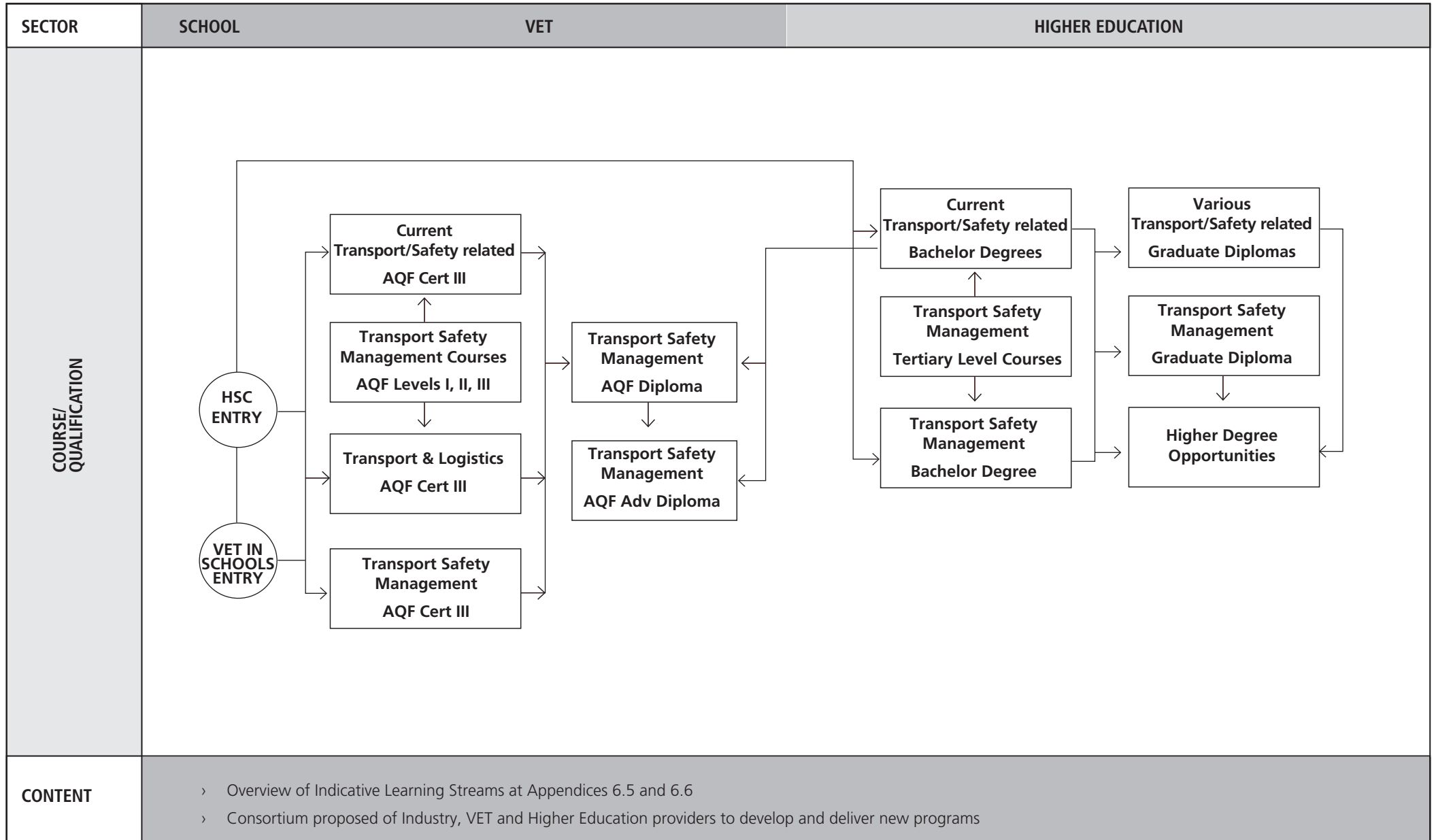
6.9 PATHWAY SCENARIO: HSC-Driven Sequence Summary



6.10 SCHOOL SECTOR SEQUENCE: HSC Driven



6.11 VET AND HIGHER EDUCATION SEQUENCE: HSC Driven



6.12 PATHWAY SCENARIO: VET Driven Sequence

