NDMP Data Dictionary Project

Reference Guide of Phase 1

Attachment 3:

Draft Data Model

Also available is the Summary Report of Phase 1

Report August 2010

Prepared by the Australian Bureau of Statistics

In accordance with the
Project Plan for the Natural Disasters Mitigation Program (NDMP) Data Dictionary Project

For presentation to
The Steering Committee for approval.

The NSW Fire Brigade (NSWFB) is the Sponsor of the Contract Material.

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1.0 Preface

A data model describes (in diagrammatic form) what types of things we need to have data about in order to have comprehensive, meaningful and useful information about an area of interest. It aims to identify and organise the required data logically and physically to support development of a database and database management system. A data model is usually prepared as a high level conceptual model first, to scope out the information required, after which it is progressively expanded into greater levels of detail from a range of perspectives (conceptual, logical and/or physical).

The data model presented in this report is intended to describe the types of things emergency service organisations need to have data about in order to have comprehensive, meaningful and useful information about the prevention, preparedness, response and recovery activities undertaken by these organisations in relation to fire and other emergencies.

A draft of a conceptual data model was prepared by the ABS, based on the outcomes of an environmental scan and literature review, and a comparative gap analysis undertaken in consultation with emergency service organisations around Australia. The consultation process with the Advisory Group resulted in a number of iterations of the initial data model. Feedback from a subsequent national workshop has resulted in three data models for Steering Committee consideration. These models are described in this document in more detail than presented in the summary report. They are now presented to the Steering Committee for acceptance to complete Phase 1 of this project.

Chapter 2.0 outlines what a data model is and the terminology used in a data model and chapter 3.0 presents the proposed data models as a result of the Advisory Group consultation.

Chapter 4.0 explains the testing of the data models and Chapter 5.0 outlines some Business Considerations for Data Model Implementation.

Chapter 6.0 provides Technical Considerations for Model Implementation whilst Chapter 7.0 provides Recommendations and the Next Steps into Phase 2.

2.0 Data Models and terminology

2.1 What is a data model?

A data model is a way of describing how data is organised and accessed. Data models are represented graphically in a diagram with accompanying text typically in the form of a data dictionary. A data model is produced for a particular subject matter (domain) and a specific purpose and is based on a formal specification. Data models define data elements and relationships among data elements.

The purpose of a data model is to aid in the understanding of data in a particular domain. There are different types of data models. Each type of data model serves a particular purpose.

The following are the main types of data models:

Conceptual data model
Used for high level planning and project definition. These models minimise the technical details and focus on describing the key subject areas and relationships among them. These models are not designed for implementing a database design as they do not include technical details such as database key structures, data types and physical properties of tables and columns.

Logical data model
The logical data model describes the data in as much detail as possible, without regard to how it will be actually implemented in the database. All entities, attributes, relationships, keys (primary and foreign) are included in the model. The model is also normalised, which is the process of removing duplication which would lead to data redundancy.

Physical data model
A physical data model contains the data definitions and all the details required to implement the data model in a database. For example, it includes details such as the size of table columns, the type of columns (text, numeric), primary and foreign keys, constraints etc. It is the blue print for implementing the model in a database table.

The Unified Modelling Notation (UML) is used in the draft model and therefore the term ‘class’ is used instead of ‘entity’ to describe subject areas. Information about the UML notation is provided further below in the report.

The draft data model presented in this report is a conceptual data model.

2.2 Why develop a data model?

The purpose of the data model is to document the information needs of emergency services so that they can:

- Establish data standards for emergency service management, including data definitions, component structures (such as for complex datatypes), code values, and data use;
- Collaborate with national emergency service standards setting bodies to define standards for the exchange of information among emergency service organisations, and government stakeholders;
- Develop technology information systems that conform to established data and data interchange standards for use in the management of data relevant to emergency services

This model is a work in progress, and has been developed to generate discussion that will lead to the development of a national data dictionary. Many of the concepts for the Data Model have been influenced by the US Public Health Conceptual Data Model. The National Information

Exchange Model (NIEM) is also based on the Public Health model and was adapted by the Department of Homeland Security in the USA.

Based on the material received from the various emergency services organisations (ESOs) and the subsequent discussions it became clear that an overarching high level model describing emergency service management did not exist. This model is needed to show the fundamental concepts surrounding emergency services and demonstrate the commonality between different organisations.

2.3 Understanding a Data Model

To assist with understanding a data model, smaller aspects of a model will be introduced. This will then be followed by diagrams of the three proposed models (See 3.0) put forward to the Steering Committee.

The Conceptual Models attempt to present the information needs of emergency services in a way that lends itself to validation by subject matter experts and has sufficient rigor and formality to be used by experts in information technology in the development of database design specifications. To meet this objective the Data Models avoids many of the details generally found in logical and physical data models such as normalised data structures, primary and foreign keys, and specification of field details such as length and decimal positions. The primary goal is to ensure that the concepts of importance to emergency services are adequately depicted and documented.

The Data Models use a fairly high level of abstraction to document emergency services concepts. This high level of abstraction extends the applicability of the model and minimises the need for maintenance. However, it can sometimes make it difficult for subject matter experts to recognise specific details they might expect to find in an emergency services data model. For example, "Where are items of interest to emergency service organisations, such as the ability to report on the value of prevention activities, reducing reporting burden on fire fighters without compromising on data quality, and being able to generate performance measures that are comparable across organisations?". These concepts are included in the Data Models. This report and consultation process is intended to find answers to these questions and others, which may arise from reviewing the models.

In most cases class names in the models have been chosen based on terms that are commonly used and recognised by most or all ESOs e.g. “location”. Some new terms have been introduced to cover the multiple meanings. An example of this is the use of the word “equipment” to describe emergency services equipment such as fire trucks, hoses, personal protective clothing, and sand bags. It is recognised that the chosen terms may not necessarily be the best fit but for the purposes of creating a model it was necessary to make a decision on what names to use. Through discussion and consultation it is expected that the model and the names used will be refined and agreement will be required where no single word is commonly used to describe a particular topic across all organisations.

The first step in understanding the Data Model is to become familiar with its components, data model terminology, and the standards and conventions used. Data Model uses the Unified Modeling Language (UML) modelling conventions. UML is a widely used data modelling standard maintained by the Object Management Group. References to information sources about UML can be found in the bibliography included in this report.

The following components of UML are used in this model:

- Subject Areas;
- Classes and Relationships; and
- Attributes and Data types.

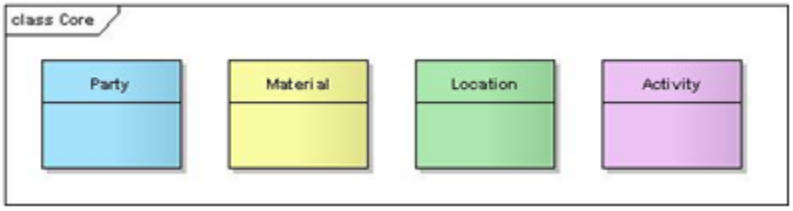
2.4 Subject Areas

A subject area is a major area of interest in a domain. Identifying these is a useful way of partitioning a model into a cohesive collection of smaller pieces or “classes”. Subject areas are a way to subset a model into chunks that permit the model to be more readily digested. Subject Areas can be translated to Core Class.

2.5 Classes and Relationships

A Class is anything about which information can be collected. Classes can be persons, places, things, concepts or events. There are core classes in the Data Model and they correspond to the subject areas. Some core classes are Cause, Activity, Location, Material and Party. Classes are depicted in the data model diagrams by a rectangular box with a line dividing the box into two horizontal sections. The name of the class appears in the top section of the box. Fig 1 illustrates how core classes may look in a Data Model.

Figure 1 Examples of Core Classes or Subject Areas



The classes of information in each of the Data Models are all interrelated. Direct relationships between Core classes are depicted in the model diagram by lines connecting the related classes via the generic Relationship Class. The UML modelling language defines many ways in which classes can be related. The Data Model uses three methods of relating classes: Supertype/Subtype Relationship, Relationship Association, and Participation Association.

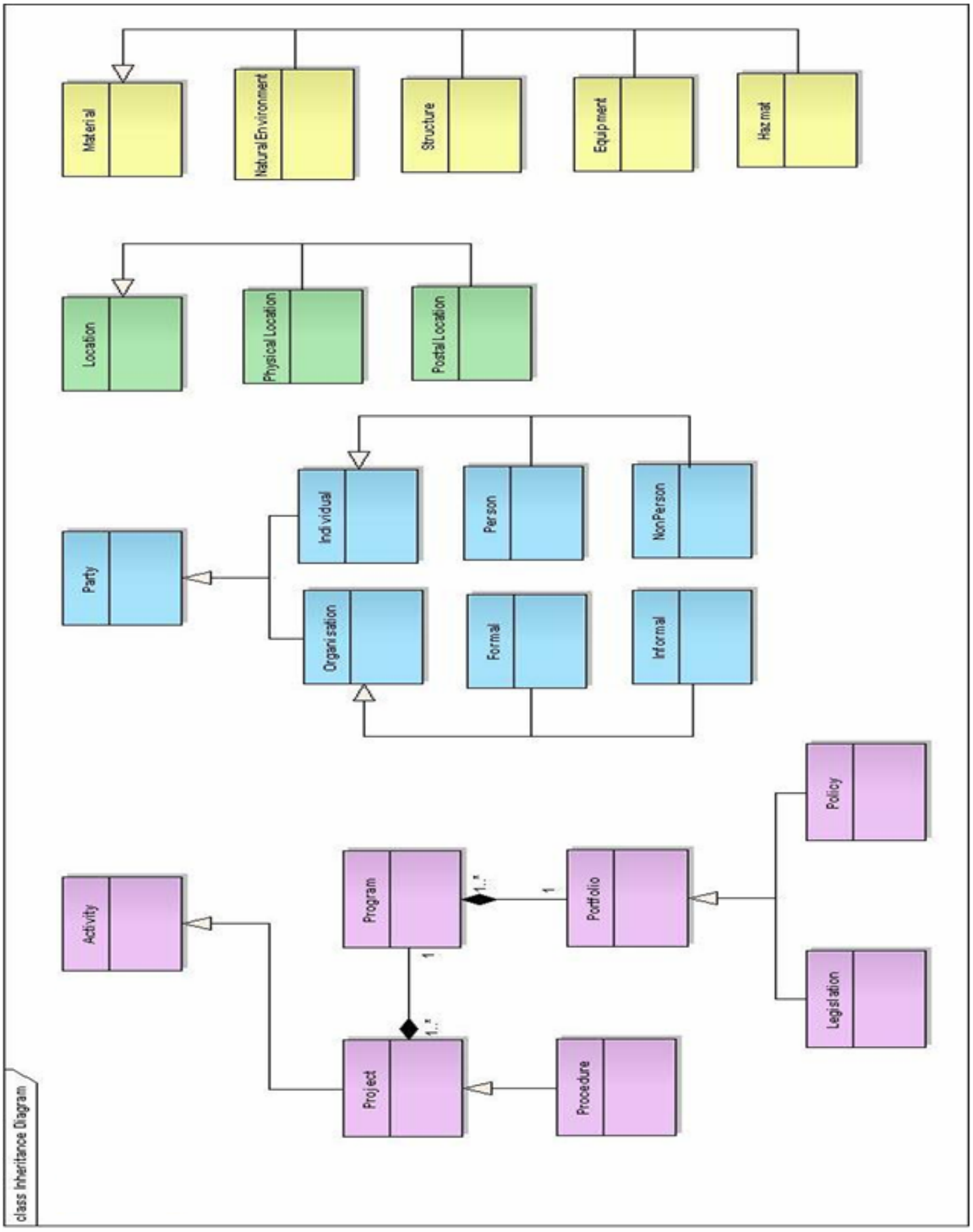
2.5.1 Supertype/Subtype Relationship

The supertype/subtype relationship is used when generic concepts represented by a class are further represented in one or more specialised classes depicting a subset of the generalised concept. In the supertype/subtype relationship the more generic class, referred to as the supertype, in most cases will have one or more specialised subtype classes or “sub classes”. The supertype/subtype relationship is depicted on the data model diagram by a line drawn between the subtype and the supertype. The line has an arrowhead on one end pointing to the supertype. Depicted below are the supertype/subtype relationships to the core classes in an example of a Data Model diagram (fig.2).

This hierarchical structuring of classes and subtypes (fig 2) makes it easier to understand a model. For example, looking at the Party hierarchy, the classes Organisation and Individual are each special types of Party. All data captured for a Party is captured for an Organisation or an Individual. The Party class has additional attributes that are captured only when the Party is an Organisation or when the Party is an Individual.

Overall agencies have agreed with most of the subclasses proposed in the original model. See Table 4 and 3.6.2 for these suggestions. There has also been feedback in the last round by the Advisory Group to expand a Class (see 3.6.1 for suggestions). These subclasses can be further discussed and agreed upon nationally in Phase 2.

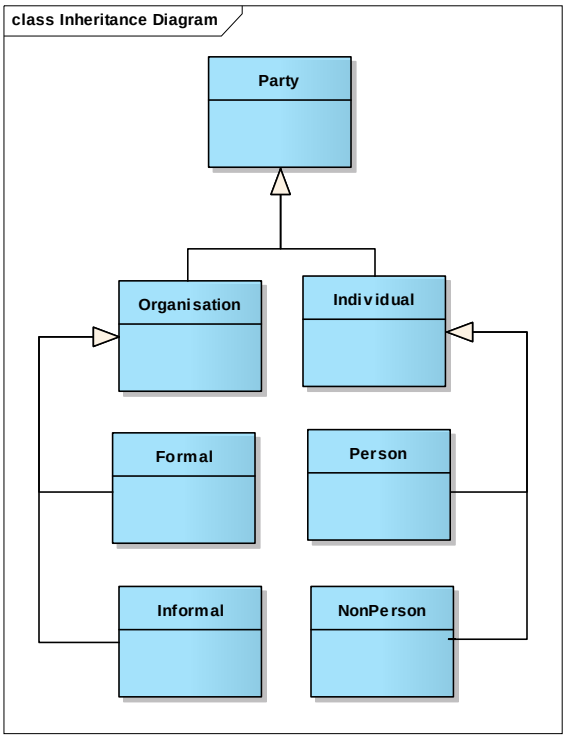
Figure 2 Examples of a Data Model showing Core Classes and their Sub Classes



Likewise, a subtype of one class may also be the supertype of one or more of its own subtypes. This is illustrated in the following diagram (fig 3) depicting the full hierarchy of the concepts modelled under Party.

The Individual and Organisation classes are subtypes of the supertype class Party. Individual is also the supertype for the Person and Non-Person Living Specie subtypes, and Organisation is the supertype for the Formal Organisation and Informal Organisation subtypes.

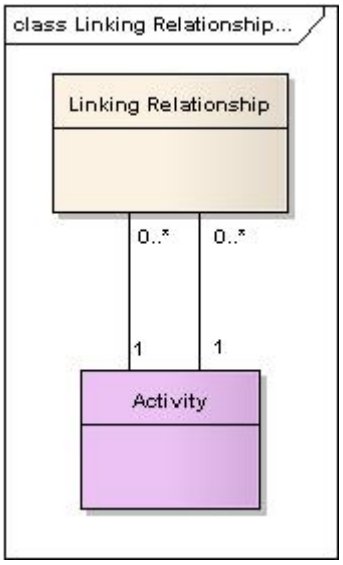
Figure 3 Example of Subclasses under Party



2.5.2 Relationship Association

A relationship association is a special type of relationship used in the Data Model to reflect the relationship instance of a core class or its subtypes has to another instance of the same core class or its subtype - in other words, where a class has a relationship to another instance of its class type. These relationships are represented in the Data Model by “relationship” classes, each associated with one of the core classes. The relationship associations are depicted in the model diagrams by a rectangular box representing the relationship class and a pair of association lines connecting the relationship class to the core class that is linked by the relationship. The Activity Relationship is illustrated in the following diagram (fig 4).

Figure 4 Activity Relationship



The symbols “1” and “0..*” that appear on the association lines depict the multiplicity of the association between the relationship class and the core class. Multiplicity is an indication of the number of instances of a class that is capable of being involved in any one association. In this case, the multiplicities indicate that each instance of the linking relationship is associated with one and only one emergency management related activity and that each emergency management related activity is associated with zero or more linking relationships. Since there are two associations, each with the same multiplicity, an instance of a linking relationship class is always associated with two instances of an activity class. A single activity may be associated with zero or more linking relationships relating it to another activity.

2.5.3 Participation Association

The participation association is a special relationship used in the Data Model to depict the relationships that exist between the core classes. Each core class has optional many-to-many relationship to all of the other core classes. For example, an instance of the party class may be related to an instance(s) of the material, location, and activity classes. Instances of material, location, and activities classes may also be associated with many instances of the party class. The participation association is depicted using a participation class. For purposes of simplification in Phase 1, we have substituted a single class "Class Relationship" for all participation associations. For Phase 2 of the project it is recommended that the relationships be expanded. The following diagram (fig 5) depicts the Class Relationship association.

Figure 5 Class Relationship association

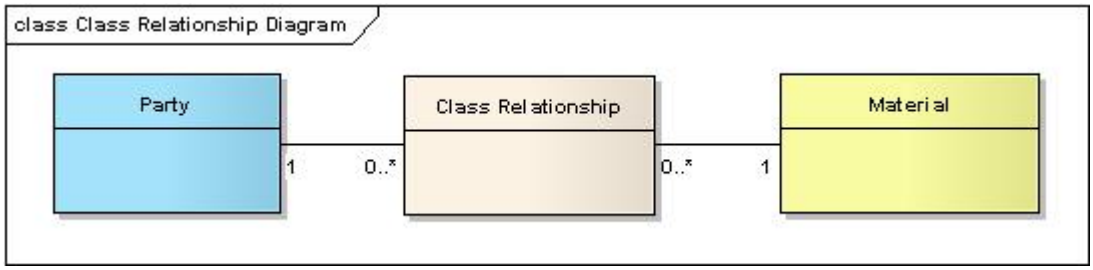


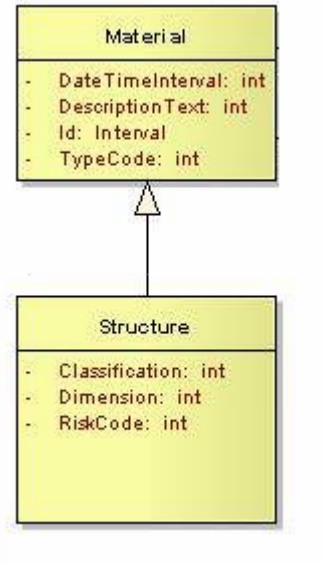
Figure 5 is an example where a Class Relationship exists between one party class and one material class. Material and party classes may be associated with zero or more Class Relationship classes. For example, if material is Hazmat equipment it may be important to reflect the party that was the lender of the equipment and the party that borrowed the equipment. This would be captured as two instances of the Class Relationship class, one for each party class, each associated with the same Hazmat equipment material class.

2.6 Attributes, Datatypes and Classification Codes

Attributes are the specific items of data that can be collected for a class in the Data Model. Each attribute has a name, a description, and a datatype assignment. An attribute name suggests the meaning of the attribute, while the description defines it, provides examples, and includes relevant discussion. The datatype assigned to an attribute extends the definition of the attribute. A datatype is a specification of the allowed format for the values of an attribute. Attributes and their datatype assignments are shown in the data model diagram by listing them in the lower section of the rectangle representing the class.

Attributes of a supertype are inherited by its subtypes. In fig 6, the attribute “Description Text” in the supertype Material class is also an attribute of the subtype classes Equipment and Structure.

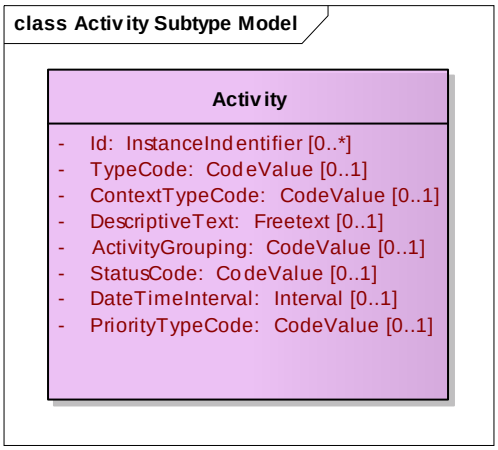
Figure 6 - Example of Material Sub Class Model



You may notice that many data types have been defined as “int” in this report when that may not be the correct data type. As the next phase of this project is to develop the Data Dictionary, the data types for the model have not been finalised in this draft model. For this reason please do not be too concerned with the data types, they have only been included for illustrative purposes.

Most classes contain attributes that link to classification codes that would need to be developed in order to implement a logical and physical model. These classification codes allow the model to be kept simple and provide the flexibility for describing different scenarios and accepting the variations in the operational aspects of different organisations. For example, in the Activity class (fig 7) we have an attribute called “TypeCode” which consists of a code value that map to the type of activity. The TypeCode would have predefined values such that would map to descriptions such as “vertical rescue”, “fire ed”, “building inspection”. Further to this, the StatusCode maps to the status of the activity and may include values such as “Incomplete”, “In Progress”, “Complete”, and “On Hold”.

Figure 7 Example of Activity Class with Attributes



As the data type descriptions are not within the scope of this phase of the project, they have not been elaborated further but have been included for illustrative purposes. Please refer to section 6.0 Technical Considerations for Model Implementation in this report for further information about classifying data. The appendix of this report includes descriptions for most of the attributes that have been included in this model.

Some examples of subject areas, classes and types of attributes are located further in this attachment.

3.0

Proposed Models

3.0.1 Rationale of Draft National Emergency Services Organisations Data Model: Summary of Findings

The findings of the environmental scan/literature review and comparative gap analysis formed the rationale for the draft data model.

3.0.1.1 Introduction

It is clear from the environmental scan/literature review and comparative gap analysis that all ESOs have strengths and weaknesses in different areas. It is also evident that, while ESOs are organised differently in each state and territory, all perform very similar functions with common goals and outcomes. All agencies provide response, preparedness and prevention activities to the community and collect detailed information about these activities, particularly those for response which has historically been the main area of business. Agencies also provide recovery activities, however collected recovery information is mainly centred on the recovery of the agencies' own people and equipment. Little information was gathered on the reconstruction or recovery of the community affected as this is mostly a function of other, agencies and organisations (mainly human service and non-government).

Although the activities across PPRR may be similar, the method or standard of describing them or recording them can be very different across jurisdictions.

3.0.1.2 Standards

Emergency Management Australia (EMA) and AFAC have provided a good avenue for following common standards in emergency management. Based on the material received and discussions held with selected agencies, the Australian Incident Recording System (AIRS) manual appears to be the only standard that is followed by most agencies. However, slightly different AIRS systems have been developed over time by some agencies. Some agencies have shared systems with other agencies e.g. CFA has provided their AIRS system to NSW SES and South Australian Fire Brigades. Also, NSW SES has provided their version of Request for Assistance (RFA) Online to Qld SES and there are currently discussions underway to expand the use of the NSW SES system to SA with some interest also shown by WA.

Given the real variety in systems and approaches across jurisdictions it is clear that there is still much to do in standardising the way things are defined and measured as well as the core processes across the PPRR spectrum.

3.0.1.3 Information Technology Systems

Budgets are tight for all ESOs and this is evident in the mix of legacy and new information technology (IT) systems supporting their business. Increasing costs and demands for services means that each agency is under pressure to deliver services more efficiently and effectively. There is also pressure to capture previously uncollected information with current systems with little comparability across Australia in standards, definitions and classifications for these new items.

Inefficiencies currently exist in agencies, with a clear separation between metropolitan/urban and rural fire services. Even where the metropolitan and rural fire services organisationally sit under one umbrella, such as in Queensland, technology systems are still separate, although here efforts are underway to unite the metropolitan and rural fire services. Technology systems play a vital role in supporting all facets of emergency management. Given the substantial investment required to develop bespoke systems, ESOs would benefit from sharing technological systems and implementing national standards.

3.0.1.4 Common Themes

There were a number of common themes which emerged from the environmental scan/literature review and the comparative gap analysis related to:

- The availability, accessibility and usability of current ESO data (many of which also appeared in the 2006 EMIDP (ABS cat. no. 1385.0);
- Emerging agency internal reporting requirements;
- Emerging industry trends in data management; and
- Emerging trends within the emergency service sector that will impact on data collection and reporting needs.

These themes include:

- Gaps in information (including spatially enabled) across PPRR, especially for prevention, preparedness and recovery activities for all hazard types as most ESO systems focus on response activities. This will provide increased and more consistent performance reporting for current and emerging national and state reporting requirements. Following the Royal Commission into the 2009 Victorian Bushfires, agencies expect an increased focus on community outcomes flowing from service delivery with a need to expand the reporting of community prevention and preparedness measures for all hazard types;
- The expansion of ESO reporting and systems and processes for routine and non-routine events including all activities/services performed and interactions amongst people and organisations. This includes prioritising and monitoring the impact and delivery of activities for large-scale, complex, multi-agency events e.g. natural disasters and major campaigns, ideally with the ability to link data from multiple sources, parties and resources (internal and external) to facilitate and support decision making before, during and after emergencies. Interoperable systems development across jurisdictions is facilitated by agencies sharing their systems e.g. NSW SES's RFA Online being used by Queensland;
- The capacity to identify, monitor, report and evaluate the cost, effectiveness and efficiency of PPRR activities, services (by service categories) and programs, possibly facilitated by the implementation of activity based costing to deliver the actual cost of the service delivery;
- Data to support the understanding of, and evidence based policy and advice on, the cost/benefit of the different treatment options across PPRR and therefore where best to allocate investment across the PPRR spectrum to increase community safety and reduce the costs and social effects of emergencies and disasters as well as the potential impacts of climate change on ESOs' activities and programs and on community outcomes;
- Data quality, comparability and consistency generally, coupled with the need for common standards, definitions, classifications and data quality frameworks to integrate data across and within systems, agencies and jurisdictions, including standard counting/business rules. The use of a common terminology and structure across ESOs would assist in breaking down the existing silo mentality;
- Data collection systems that support data quality, integrity and timeliness and reduce the data collection burden on operational staff (including too many data fields and too many code choices), by increasing the capacity to collect data only once in relation to any activity or event (including automatic capture or from other operational systems) thereby avoiding the need for multiple entries of the same information and any potential data quality issues. Ideally, this data capture would be during the actual activity or immediately afterwards and will be scalable for larger events;
- A lack of understanding by data providers in the uses of the data resulting in data not 'fit for purpose';
- Capturing and reporting demographic information to assist with the identification of vulnerable and 'at risk' groups and 'repeat clients' and to assess the effectiveness programs and services for these groups;

- It was evident that there was a need for efficient and effective management and governance of existing and future data/information through the lifecycle of data editing, storage and dissemination. This was seen by poor quality or no documentation pertaining to data collection systems, processes and technical schemas and an inability to easily access information, often having to rely on 'experts' to extract and interpret data, particularly from legacy systems. The use of data warehousing will assist in the delivery of information through facilitating informed decision making at all agency levels by allowing easier data access, data manipulation and presentation (one agency has found that data warehouse development has already had a profound impact on consistency); and
- Falling volunteer numbers is of concern and will impact on rural fire and state emergency service provision. More targeted funding may assist with the falling volunteer numbers.

These themes reflect drivers for change for the development of a data model to rationalise information management across emergency management and ESOs.

3.1 Consultation feedback

Since the initial draft data model was developed by ABS, there have been three rounds of consultation with the Advisory Group, where the Data Model, Report and Attachments have evolved with each consultation round.

3.1.1 First Consultation Round

The First consultation was with the Project's Advisory Group members and ran from the 3rd of March 2010 to 14th April 2010.

The key feedback identified from the Advisory Group Consultation round and the response given was:

Table 1 First round of Feedback

Feedback Received	Response
Some stakeholders were finding the model and supporting documentation difficult to understand	To enhance the understanding of the draft data model the project team and NSWFB will be presenting the latest version of the data model at a meeting for Advisory Group and Steering Committee Members on the 22nd June 2010.
A common area of concern was the Activity core class and the perceived overloading of this class	The ABS has unpacked the Activity Class and promoted Event and Incident Subclasses to Class level. This changed the original model from 4 Core Classes to 6 Core Classes.
The relationship classes were difficult to follow when mapping scenarios to the model	The ABS has simplified the draft data model by substituting participation associations (relationships between core classes) to that of a single class named "Class Relationship". All relationship associations (relationships between instances of the same core class or subtypes) have been named "Linking Relationship". It is expected that the relationship classes be expanded in Phase 2 as suggested in the original model for a comprehensive Data Dictionary to be built in Phase 2.
Project\Program\Portfolio Classes were	Project\Program\Portfolio are still connected to

generally supported as required concepts, but there were differing views as to their relationship to other major classes	the Activity Class and after the presentation by the ABS on 22/6/2010, it will be asked of the Advisory Group and Steering Committee to discuss with their agencies and jurisdictions to decide on where within the model the Project\Program\Portfolio is best connected.
That NSWFB felt that the model included some backend functionality, such as costing of PPRR activities.	The contract states the project will cover all operational PPRR activities and it is not expected that operational PPRR activities would include certain back office activities for running an agency e.g. Payroll (including superannuation and claims for compensation), HR and IT. However, part of the project is to find out what agencies agree to be relevant here. So the question will be raised to the Advisory Group to determine if costing the operational PPRR activities is to be included in the model and the Data Dictionary Phase. The issue put forward to the Advisory Group is whether the costing of the operational PPRR activities is to be in scope, and if so, then the consultation will have to decide how to cost the activities so that they are comparable. The challenge would be to find a national costing framework that can be used across state boundaries to resolve this issue to ensure National acceptability. This task might be bigger than the intent of this current project and may be better suited to a future enhancement of the model if required at all.
Given that only 3 agencies gave feedback on the model, the ABS was concerned that the proposed National conceptual model would be based on local jurisdictional systems, processes, vocabularies and other biases, rather than an independently assessed national view of Emergency Services (ES), as delivered by the ABS	This issue is covered by the presentation set up for the Advisory Group and Steering Committee in June.
The agencies comments so far in the Advisory Group feedback are mainly with regard to the capture of "Response". Currently response is centred on "incident" for many agencies. The model is to capture all of PPRR activities, not just response. The areas not captured extensively by ESOs to date have been the activity areas of preparedness, prevention and recovery, which do not always rely on a call from the public and may not be known as an "incident".	The ABS believes the model to be very flexible and does capture PPRR for the ESOs. However the ABS suggests that during the Advisory Group and Steering Committee review period that all areas of PPRR be tested (even any aspirational areas) to ensure activity for PPRR can be captured for all agencies and jurisdictions.

3.1.2 Second Consultation Round

A workshop between the Advisory Group, Steering Committee, NSWFB and ABS staff was held on 22 June 2010 to discuss the latest version of the conceptual data model. A number of key areas were identified as requiring further explanation and\or explicit definition in the conceptual model. Written feedback clarifying agency concerns was received from a number of attendees. The main areas of concern, as summed up by the Managing Sponsor based on the discussion held at the workshop are:

- Event and Incident;
- Addition of another class titled “Cause”; and the
- Addition of another class titled “Outcome”.

All parties were happy with the Location Class, Party Class and Material Class and agreed that the simplification of the Class Relationship and Linking Relationships clarified the model.

3.1.3. Third Consultation Round

As the project has progressed, more agencies and jurisdictions have put more thought, energy and ideas into what is needed to capture the information required, now and in the future for ESOs, as the model has began to be understood. Two new models (Models 2 and 3), have been proposed in the final round of the Advisory Group consultation. There are no known issues with these models (2 and 3) at this time and as such have not undergone rigorous testing by all agencies and all jurisdictions.

The proposed data models presented will aid in discussion towards a unified model on emergency services management. Much research was conducted in producing the original model and existing models in industry have influenced the model. The proposed models are based on the information supplied by the organisations mentioned in this report. Various database schemas, system documentation and consultations, gave an overall mix of new and legacy information systems. Due to initial limited consultation with stakeholders, it was essential that there was further consultation, discussion and possible revisions made to reach national agreement on the data model.

ABS has reviewed and tested all 3 models against a number of scenarios across the PPRR framework. Allowing for minor semantic differences, ABS believes that all 3 models are representative of the national ESO business domain. ABS is confident that differences between the models in the Activity domain can be resolved through further discussion by agencies before or during Phase 2 of the project. Such agreement may become clearer during Phase 2 of the project as attributes (business information) are comprehensively detailed in a data dictionary. Scenario based testing can continue at all stages of phase 2. ABS would recommend that the contractor for Phase 2 agrees to expose a number of early drafts of the data dictionary to facilitate early testing, discussion and agreement.

3.2 Reasons for Three Models

Currently the model is gridlocked with various jurisdictions raising various models in the last Advisory Group round. The common threads to these three models are that they have 4 classes in common. The 4 common classes are: Material, Location, Party and Activity Classes and these 4 classes were the classes proposed originally by the ABS. All agencies agreed with Activity, Location, Material and Party Classes leaving the Cause, Effect, Response, Event and Outcome Classes not resolved by the Advisory Group. When creating the data dictionary in Phase 2 more information as to which terms are the same, similar or completely different will make the decision of whether an object should be a special class, subclass or an attribute.

All the models present the primary Classes that describe emergency service management. The focus is on the operational aspects although it could also include non-operational concepts outside the scope of this project. The purpose of these high level models is to lead discussion, not to provide explicit detail. The detail will be forged during Phase 2 of this project, in working towards the development of a data dictionary.

3.3 Proposed Data Models

Model 1

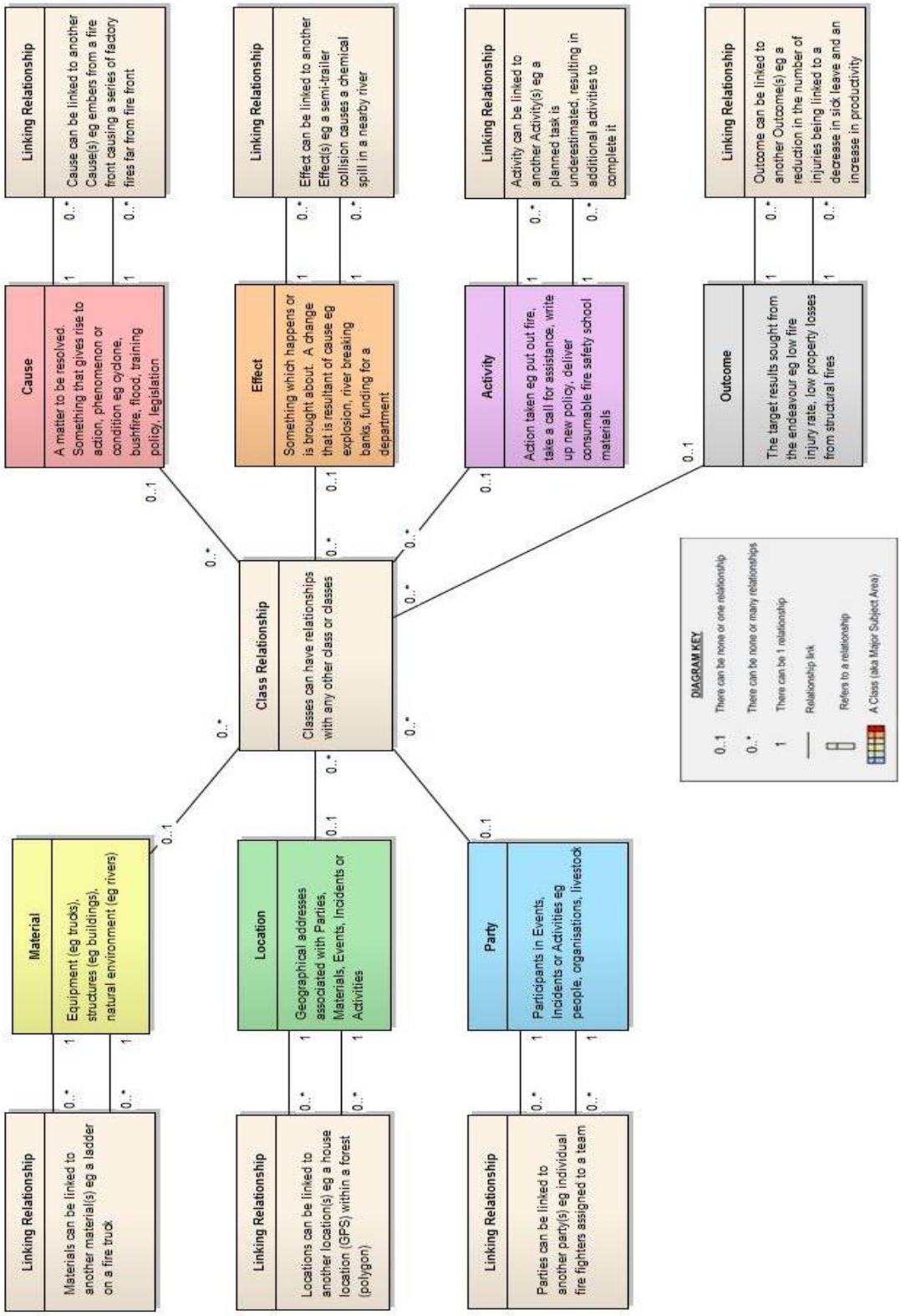


Fig.8

Model 2

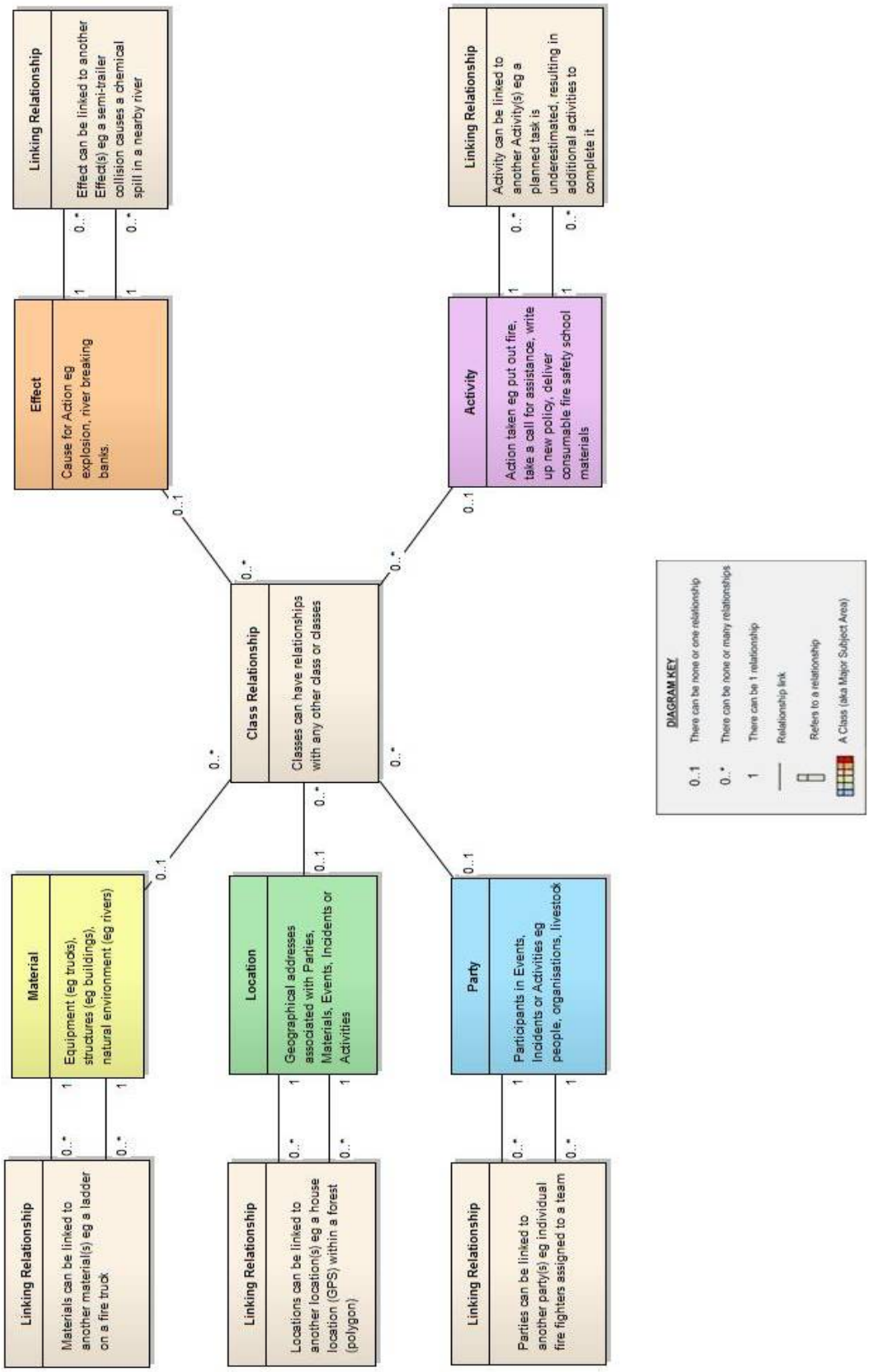

Linking Relationship
Effect can be linked to another Effect(s) eg a semi-trailer collision causes a chemical spill in a nearby river
Linking Relationship
Activity can be linked to another Activity(s) eg a planned task is underestimated, resulting in additional activities to complete it
Effect
Cause for Action eg explosion, river breaking banks.
Activity
Action taken eg put out fire, take a call for assistance, write up new policy, deliver consumable fire safety school materials
Class Relationship
Classes can have relationships with any other class or classes
Material
Equipment (eg trucks), structures (eg buildings), natural environment (eg rivers)
Location
Geographical addresses associated with Parties, Materials, Events, Inddents or Activities
Party
Participants in Events, Inddents or Activities eg people, organisations, livestock
Linking Relationship
Materials can be linked to another material(s) eg a ladder on a fire truck
Linking Relationship
Locations can be linked to another location(s) eg a house location (GPS) within a forest (polygon)
Linking Relationship
Parties can be linked to another party(s) eg individual fire fighters assigned to a team
DIAGRAM KEY
0..1 There can be none or one relationship
0..* There can be none or many relationships
1 There can be 1 relationship
Relationship link
Refers to a relationship
A Class (aka Major Subject Area)

Fig. 9

Model 3

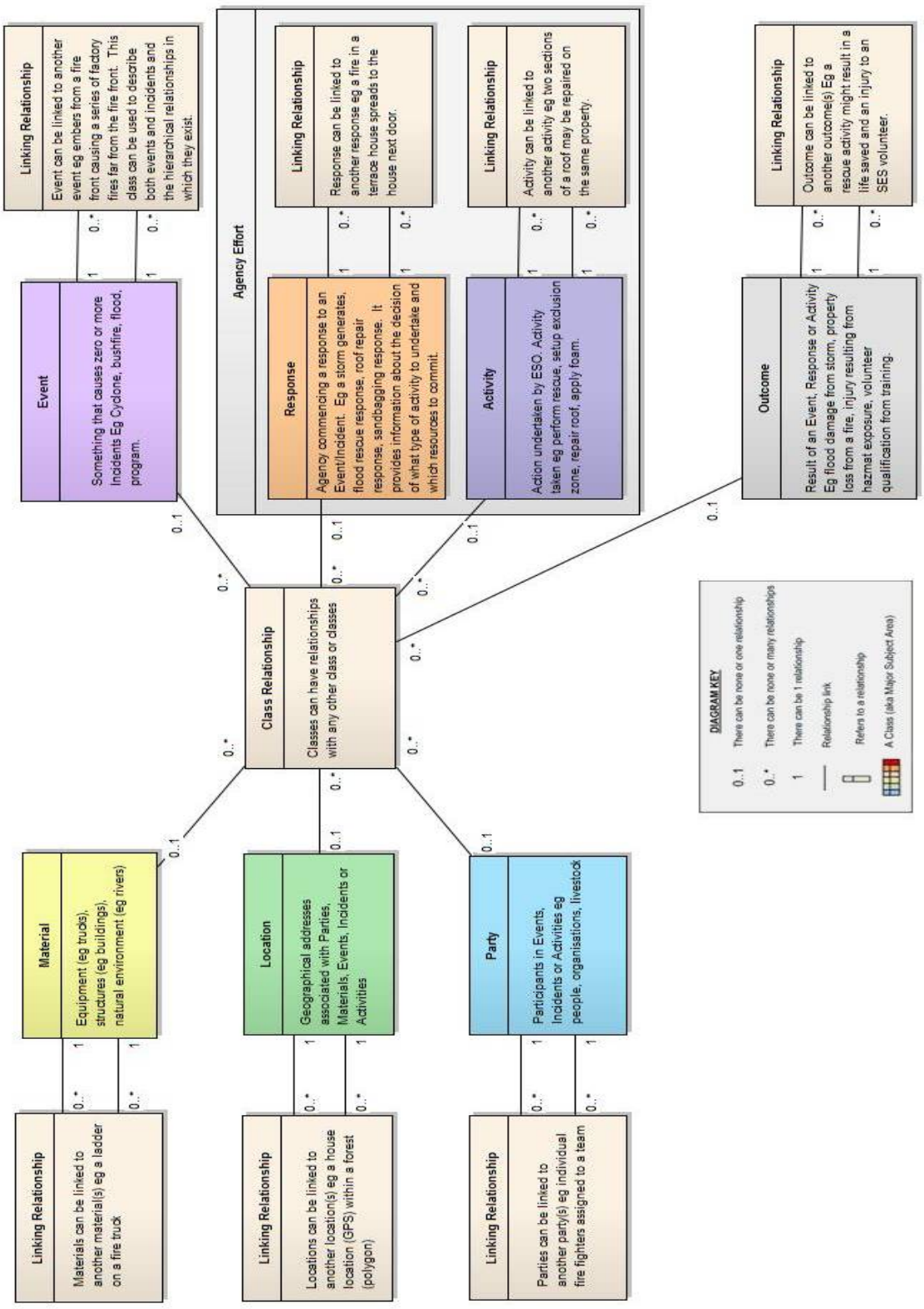


Fig 10

3.4 Similarities and Differences of the Data Models

Table 2: Comparison of the 3 models

Concept	Model 1	Model 2	Model 3
Location	√	√	√
Party	√	√	√
Material	√	√	√
Cause	√	√ (as attributes)	
Effect	√	√	
Activity	√	√	√
Outcome *	√	√ (as attributes)	√
Event			√
Response			√
Class Relationship	√	√	√
Linking Relationship	√	√	√

Key: √ Includes this concept
* Definitions vary in models below.

3.4.1 Similarities

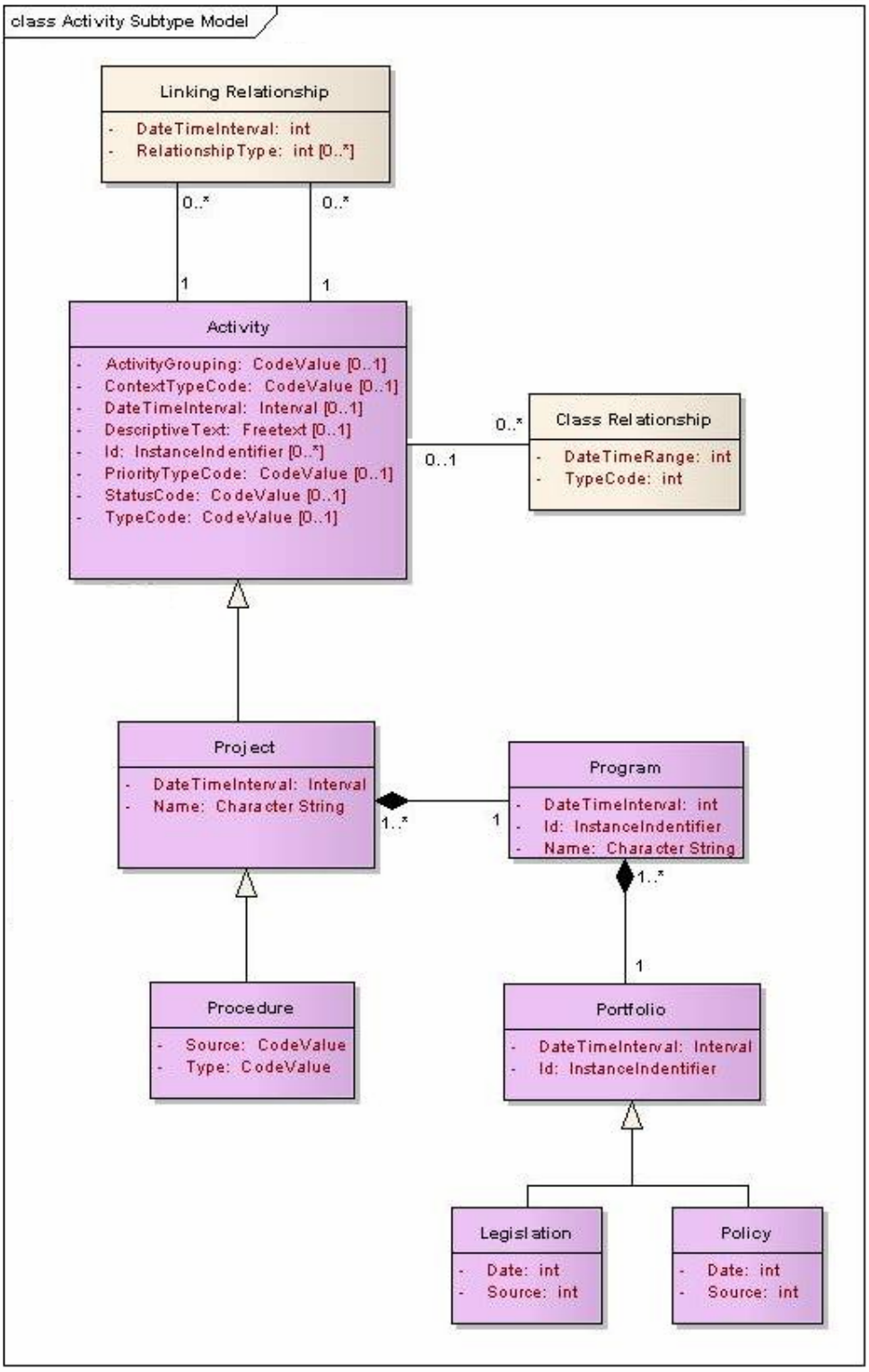
This section will give definitions and examples of the Core Classes, or Subject Areas that are similar in each of the models.

3.4.1.1 Activity

The *Activity* subject area (fig.11) is:

- anything that an ESO does either in delivering services or supporting its own business and Preparedness, Prevention, Response, and/or Recovery should be captured for each activity undertaken.

Figure 11 Example Class Activity and Sub Classes (with attributes)



For example an emergency services related activity might be responding to an incident such as a road crash, back-burning activities in fire prone areas, educating pre-school children on the risks of fire, maintaining inventory such as sandbags for flood prone regions, and inspecting a building for fire safety

They may also be activities not directly related to incidents such as maintenance of equipment or planning resources for response activities. Activities are conducted at a particular location and there may be more than one location associated with an activity. Certain Materials may be involved in the activity. With any Activity there are people involved.

All emergency management activities are shaped by various policies and legislation. Various plans exist or are created for these activities. For example, state disaster plans on how to respond to floods and storm incidents/events exist. These are activated when the relevant situation arises. The New South Wales State Flood Sub Plan from June 2008 is one such plan.

Portfolio management is about assessing whether the right program of work is being done. For example when a Brigade decides to conduct educational visits to pre-schools, a decision needs to be made as to which ones will be chosen. Hypothetically if the government were to provide $100 million funding to an ESO, the decision on how the money gets spent is a portfolio decision. Investment decisions are made at the portfolio level. Any plans, acts, legislative rules guide investment decisions at the portfolio level. Any major decision, irrespective of whether it involves multiple organisations or it's a short or long term decision would be made at the portfolio level.

An activity is a series of tasks that are undertaken as a result of an event or an incident or for operational purposes. These tasks can be planned or unplanned. They are based on predefined plans, training and legislation defined at the portfolio level. Typically an event or incident triggers activities which are treated like a project. The project has a specific outcome and purpose with a start and end date. For example with a Road Crash Rescue, the project commences on notification from the call centre for assistance from the nearest station. Extrication, road blocks, post incident reporting and more may be provided as part of the activities involved in the project. The activities conducted by the emergency services personnel are predefined in various plans (in this case for dealing with a road crash) and legislation. They are also incorporated in education and training of emergency services personnel. Due to legislative requirements, any medical treatment would be conducted by Ambulance workers and basic medical assistance would only be provided if the Ambulance were delayed.

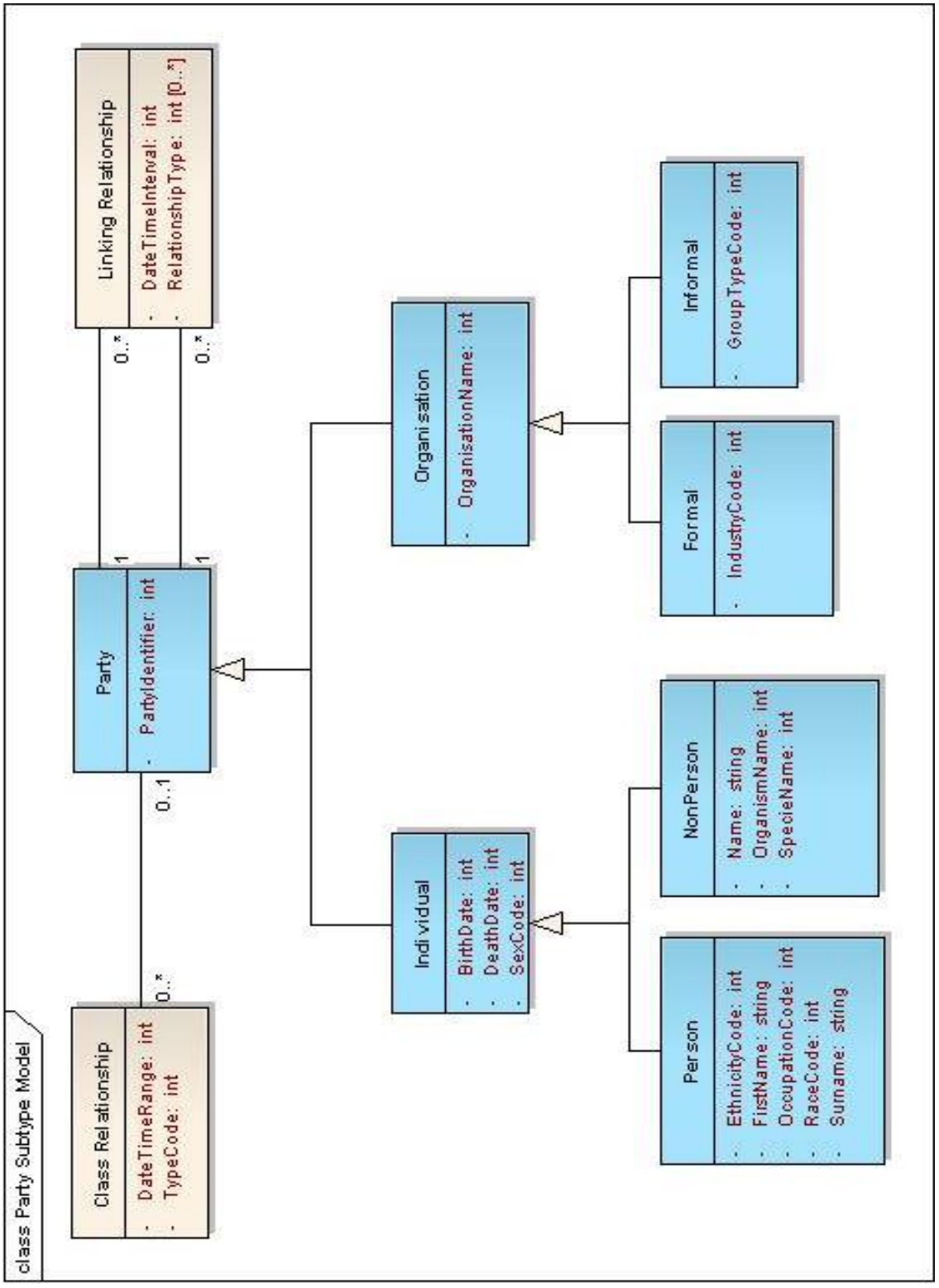
A series of projects may be part of a larger program. Fire education for all schools in a state or territory is an example of such a program. Thus, the model describes the project, program and portfolio relationship as an aggregation (solid diamond in the notation).

Decisions are made at the portfolio level as to how the program will be tackled including the interactions with external agencies.

3.4.1.2 Party

The Party SubType model (fig 12) expands upon the top level model in describing the key concepts around party.

Figure 12 Example of Class Party and Sub Classes (with attributes)



The *Party* subject area contains information about the participants of emergency service related activities. A party may be an individual person or non-person living specie, or a formal or informal organisation. Typical examples of parties include emergency service workers including volunteers and the general public. Formal organisations include an emergency service organisation, a government department, a school, and a small business. Informal organisations would be the local community or neighbourhood. Non-person living specie includes animals such as livestock, birds, or pets.

Party describes different groups or individuals that have some relationship with an activity. They may be a formal or informal organisation such as a government agency or a local community. A party may be an individual such as a human being or an animal. Parties may be ESO personnel attending an incident or members of the community involved in an activity such as community fire education.

The Individual subclass describes the common features of humans and non humans; date of birth, date of death and sex. The Person class describes any human beings such as emergency service workers, victims, members of the community. The NonPerson class describes animals such as livestock, pets and wildlife.

The Organisation class provides a generic description for any type of organisations. The Organisation class has been further specialised by the sub classes Formal and Informal. The Formal class describes formal organisations official groups of people such as a business. The Informal class describes informal organisations such as unofficial groups of people such as the local neighbourhood.

Members of the community may make up an informal organisation, in the event of a major disaster they may come together to assist one another. Likewise, multiple organisations may come together in responding to an event such as the case was with the Victorian bushfires; interstate fire fighters came together with the CFA, SES to help with response activities. The army may also be involved in major disasters to assist in recovery efforts.

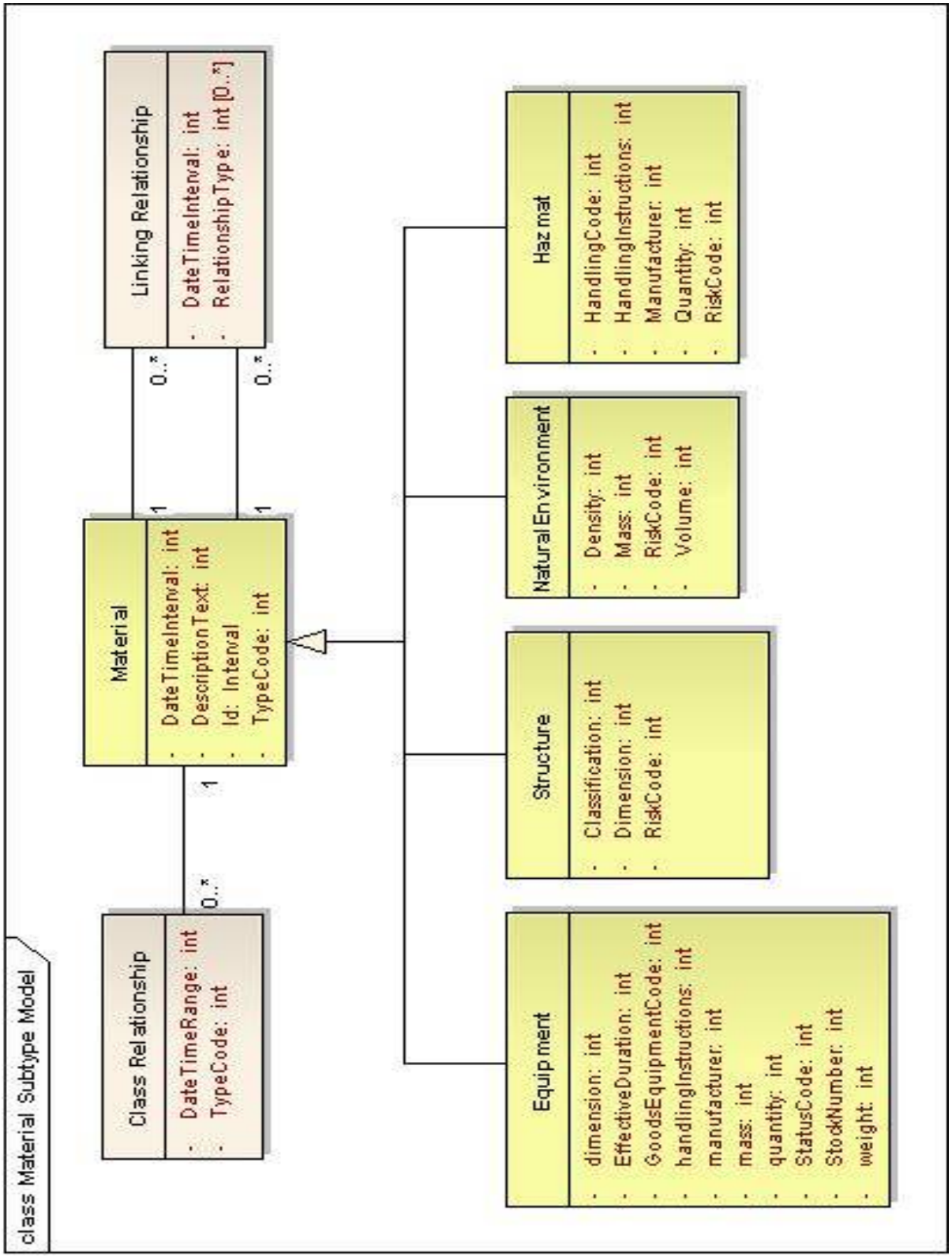
Every activity has one or more persons involved. Emergency services workers as individuals may be part of a formal organisation such as the NSW Rural Fire Service.

As mentioned previously, the Linking Relationship describes the relationship between different parties. This may be used to describe the relationship between different stations and their responsibilities for different areas of the state or territory they are in.

3.4.1.3 Material

The Material SubType model (fig 13) expands upon the top level model in describing the key concepts around material.

Figure 13 Example of Class Material and Sub Classes (with attributes)



The *Material* subject area contains information about Equipment such as fire trucks and breathing apparatus, Structures such as buildings and bridges, and Natural Environment materials such as rivers and mountains.

The Macquarie dictionary defines Material as follows:

1. *The substance or substances of which a thing is made or composed.*
2. *Any constituent element of a thing.*
3. *Anything serving as crude or raw matter for working upon or developing.*

The Macquarie definition broadly describes the broad forms of Material used in emergency management. Through the Environmental Scan/Literature Review it was found that no other word adequately described the different types of materials used.

For this data model, Material comprises of things such as equipment, structure and features in the natural environment. The level of granularity can be variable so it may be describing a vast region of forest or a piece of equipment such as a helmet.

A number of sub classes have been included in this class. The Equipment class describes the various types of equipment used in the course of emergency services activities. The term Equipment was used over Appliance (used by a number of ESOs) to describe different scales of equipment – from fire trucks to gloves. Examples of equipment include, fire hoses, a fire extinguisher, personal protective equipment, buckets, ladders etc. Attributes of equipment describe items such as how to use the equipment (handling instructions), manufacturer details, size, quantity, the life of the equipment (effective duration). These attributes are not all mandatory and will vary based on the piece of equipment. The purpose is to ensure that both managed and unmanaged equipment are appropriately described.

The Structure class describes any man made material excluding equipment or hazardous material. Structures would include buildings, bridges, fences, and walls.

The NaturalEnvironment class describes non man-made materials such as trees, forests, cliffs, lakes, rivers, and mountains. The purpose of including this class is to assist with describing the environment in which a particular activity may be conducted. For example when conducting a back burning exercise, the density of the forest or the grass would be pertinent, likewise, in planning prevention activities bushfire risk for a national park may be relevant. Further to this, it may be used to describe the strength of the current for a river.

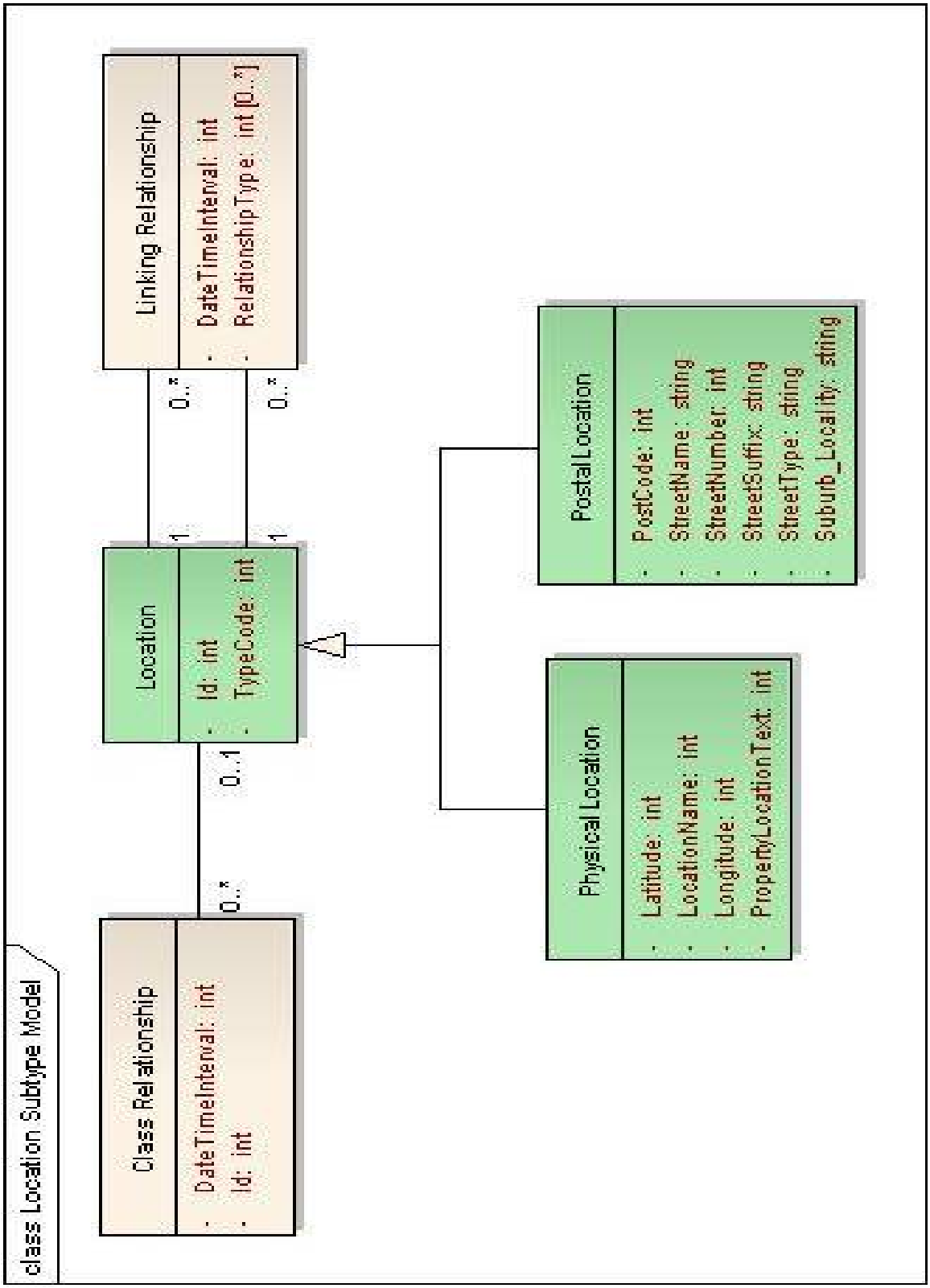
The Hazmat class describes hazardous material such as chemicals and gases.

Linking Relationship describes the interaction or relationship between multiple materials. For example, a building may be fitted with safety equipment such as sprinklers and smoke alarms. A chemical spill (hazardous material) may be treated using specialist equipment.

3.4.1.4 Location

The Location SubType model (fig 14) expands upon the top level model in describing the key concepts around location.

Figure 14 Example of Class Location and Sub Classes (with attributes)



The *Location* subject area contains information about addresses associated with Parties; emergency services related Events; Incidents; Activities; or Materials. Location information may be a postal location, or a physical location. Typical examples of locations include street addresses, post office boxes, geographic coordinates, and spatial references such as four kilometres north of town.

The Location class describes the place for an activity, incident or event. It may also be the location of a party or material. Environmental conditions such as terrain and elevation are also described in the location class. The type code attribute of the location class describes the type of location such as residential building, hospital, government building, commercial building, parkland, district such as a local government area.

The sub class Physical Location describes the actual geographic coordinates of the location. When receiving a call for an emergency, the Physical Location class would be used for attending the incident. It would also be used for mapping and tracking incidents. The Postal Location is the postal address of the location and would be based on Australia Post addresses. It does not include post box addresses.

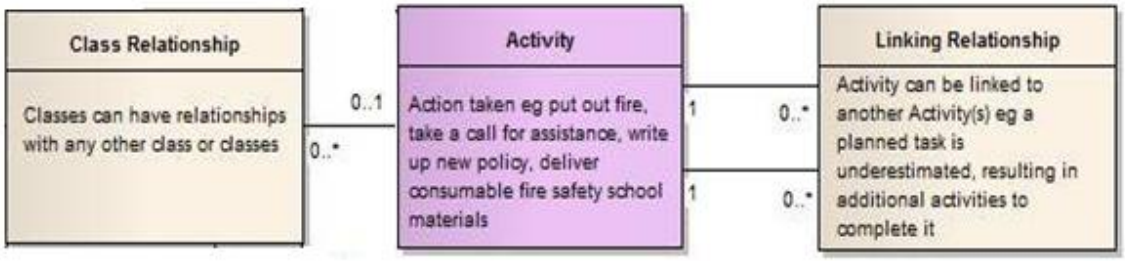
3.4.1.5 Relationship Classes

Other classes represented in the Plain English Top Level Class Model contain the word Relationship. These are Class Relationships and Linking Relationship Class (Fig 15).

Class Relationships - depicts the relationships that exist between the core classes. Each core class may or may not have a relationship to either 1 or many other core classes e.g. a local community is attending a presentation on fire education. The local community would be described by the Party class and the Fire Education Presentation is the Activity class. The Class Relationship is the interaction between the two classes, in this example "is attending" describes this connection (refer to Attachment 3 Section 2.2.2.3 for more detail).

Linking Relationship Class – is a relationship association which reflects the relationship of a core class or its subclasses to another instance of the same core class or its subclasses e.g. the Material class has a Linking Relationship class to describe the relationship between multiple materials. That is, hazmat decontamination kit may be stowed on a particular fire truck (refer to Attachment 3 Section 2.2.2.2 for more detail).

Figure 15 Relationship Classes



3.4.2 Differences

3.4.2.1 Model 1
This model consists of 7 core classes i.e. Cause\Effect\Activity\Outcome and Material, Location and Party (Fig.8).

The core classes are:

- **Cause** – Cause could be defined as a matter to be resolved; something that gives rise to action, phenomenon or condition e.g. cyclone, bushfire, flood, training, policy, legislation;
- **Effect** – is something which happens or is bought about; a change that is the result of a cause;
- **Activity** – Anything an ESO does either in delivering services or supporting its own business. Such as put out a fire in the house caused by an arching power line; put a tarp over the roof and rescue the cat that has run up the tree;
- **Outcome** – could be defined as the target results sought from the endeavour. For example low fire injury rate, low property losses from structural fires;
- **Location** – Information about geographical addresses associated with Events, Incidents, Activities, Parties or Materials;
- **Material** – Information about equipment e.g. fire trucks and breathing equipment; and structures e.g. buildings and bridges; and the natural environment e.g. rivers and mountains; and
- **Party** – Information about participants of emergency service related activities e.g. people, organisations, livestock.

3.4.2.2 Model 2
Model 2 consists of 5 classes of Effect\Activity and Material, Location and Party (Fig. 9).

The core classes are:

- **Effect** – Cause for Action e.g. explosions, river breaking banks
- **Activity** – Action taken e.g. put out fire; take a call for assistance; write up new policy; deliver consumable fire safety school materials. **Material** – as per definition in Model 1
- **Location** – as per definition in Model 1
- **Party** – as per definition in Model 1
- **Note in this model**: Causes and Outcomes are captured as attributes rather than by classes. They are defined as follows:
  Cause - Something that gives rise to an action, an event, a phenomenon or a condition.
  Outcome - The consequence of a course of action (or inaction) taken in response to an effect.

3.4.2.3 Model 3
Model 3 consists of 7 classes of Event\Response\Activity\Outcome and Material, Location and Party (Fig. 10).

The core classes are:

- **Event** – Something that causes zero or more incidents e.g. cyclone, bushfire, flood, program.
- **Response** – Agency commencing a response to an Event/Incident e.g. a storm generates, flood rescue response, roof repair response, sandbagging response. It provides information about the decision of what type of activity to undertake and which resources to commit.
- **Activity** – Activity undertaken by ESO. Activity taken e.g. perform rescue, setup exclusion zone, repair roof, apply foam.
- **Material** – as per definition in Model 1

- **Location** – as per definition in Model 1
- **Party** – as per definition in Model 1
- **Outcome** – Result an Event, Response or Activity. E.g. flood damage from storm, property loss from a fire, injury resulting from hazmat exposure, volunteer qualification from training.

3.5 Support for Models

Various agencies in the final round of the Advisory Group support the following:

Table 3: Agencies support for models

Agency	Preferred Model	Issues Raised
NSWFB	Model 3	
OESC Vic	Model 2	
Tas Fire	Model 1	▪ Terminology needs to be clearly defined ▪ Concern about Activity core class in Model 1 ▪ Require flexibility to change in Phase 2
Vic MFB	Aligned with Model 2	▪ Outcome measures based on national data, not necessarily a core class
WA FESA	Model 1	▪ Require flexibility to change in Phase 2 ▪ Cost (of activities etc) is an important measure across the model ▪ Effect should also capture categories such as value, networks, heritage, environment & cultural
CFA Vic	Aligned with Model 2	▪ Outcome measures not necessarily a core class use attributes ▪ Cause can be an attribute
SA MFS	Model 1	

3.6 Summary of the key findings by agencies

Comment provided in anticipation of the revised data model and feedback now received from the last round of the Advisory Group have now been incorporated into this document.
The main area of concern is still the right hand side of the model, where there are some differences of opinion between jurisdictions. However the majority agree that there should be an Activity Class.

It is important to not here that in the event that all feedback cannot be addressed, the Steering Committee will make final decisions for the model in accord with the project's agreed governance structure.

In the third round of consultation with the Advisory Group the ABS has received feedback from the following agencies: WA FESA, CFA Vic, Department of Justice Vic, NSWFB, SA Metropolitan Fire Service, Victoria MFB, and Tasmania Fire Service. The following is a summary of the key findings provided form each agency.

3.6.1 WA FESA

Preference is given to:

Capturing the cost in reporting requests; suggest a specific class titled “Cost” or “Value”;
Some subclasses under the Effect Class such as:

Value – this may be an alternative solution to the proposed Cost class above;
Networks – lifelines, utilities, health, transport, telecommunications;
Heritage;
Environment; and
Cultural.

Subclasses are agreed as a minimum set in Phase 2 and that these can be expanded; and
Discussion on core data will inform not only the data dictionary but also the proposed schema.

3.6.2 CFA
Preference is given to:

A class for Activity as it is the key to explaining what we do, and why we do it;
Retain Sub-Classes for Project and Program and Portfolio;
Legislation and Policy not as important to Emergency Services as Sub –Classes could be attributes;
Supports Incident as a Sub-Class of Activity;
Cause should not be a separate class as Cause is inseparable from the Incident. Cause can be an attribute of Incident and Activity;
Event Class is not needed;
Outcome does not need a separate class as it would be more neatly captured as attributes of Class Relationships; and
Model with the five classes of Material, Location, Party, Effect and Activity.

3.6.3 SA Metropolitan Fire Service

Preference is for the draft data model as it is.

3.6.4 Tasmanian Fire Service

Preference for the current model with the following caveats:

A right of reply to any significant changes proposed by other jurisdictions;
The need to ensure that terms used are clearly defined e.g. Event, Incident etc;
Some remaining doubt that the 'Activity' section of the Model is workable as it currently sits;
An acceptance that the Model can be changed for some time yet; and
That the various Classes can have established relationships with each other as this ensures maximum flexibility.

3.6.5 VIC MFB

Preference is given to:

A model with Cause, Effect, and Activity;
No Outcome class; and
To report on outcomes we will need good comprehensive national data from which to undertake the relevant testing/analyses.

3.6.6 OESC Vic

Preference is given to:

A five class model consisting of Material, Location, Party, Effect and Activity;
No Cause or Outcome Classes;
Cause and Outcome are implemented as attributes;
Key relationship principles of the model are maintained. These being: classes can have relationships with any other class (Rule 1), and each class is capable of a linking relationship with itself (Rule 2).
Clear definitional issues to be addressed;
Phase 1 of the National Data Dictionary Project delivering both the model as a result of the Presentation in Melbourne and OESC Vic's proposed model for further consideration in Phase 2; and
Early part of Phase 2 should stress test the model from the workshop and the model below against various scenarios to determine a preferred direction/approach.

3.6.7 NSWFB

Preference is given to a model consisting of Material, Location, Party, Event, Response, Activity and Outcome.
Event (what has occurred) – Phenomena, (e.g. cyclone, bushfire, earthquake) condition, situation or "something" (such as new legislation or changed building codes) that gives rise to the need for ESO to commit agency resources for action. An event may be simple or multi layered, and may cause zero or trigger multiple incidents. It provides context as to why the ESO activity is required and an explanation and justification for the resources consumed

Response/ Reaction/ Commitment – It provides information about the decision of what type of activity to undertake and which resources to commit

Activity – Activity undertaken by ESO.

Outcome – This feature provides information on what happened as a result of the ESO activity (although it needs always to be recognised that the nature of events and other factors also have a significant influence on outcomes.)

3.7 Discussion on changes put forward

3.7.1 Capturing the cost

A comment had been received that the model should allow for the costing of operational activities. The ABS believes that this is out of scope for the current initiative since to develop a national costing formula would be a considerable undertaking. At the meeting in June, ABS clarified with the group that the requirement was not that the model identifies costing formulas, but that it simply captures the activities that were required to populate a costing formula. It was agreed at that meeting that the identification of costing formulas was out of scope for this project. However it is understood that there is a need to capture the cost in reporting requests.

Cost and cost classification could be captured in the relationship classes. There is an ability to collect information on costs and damages as the ESO business occurs. There could be an array of data collected.

ABS sees this as part of a discussion where agencies would need to discuss national recording of costs so that agreement on classification when needed could take place. For example, the cost of volunteer, which costing framework that they use etc. Some of the costing models will be outside of this model such as depreciation of assets and payment of salaries as these are seen for this project out of scope. Where as this model could capture the costing of PPRR activities.

ABS Recommendation:
That the SC group focuses on cost management in Phase 2 rather than in the Conceptual model stage.

For the Steering Committee: No further action at this stage

3.7.2 Classes, Sub Classes or attributes

There were differing opinions about recording various ESO business concepts in the model as classes, Sub Classes or attributes. The project team acknowledges that there is not a wrong or right answer at the conceptual modelling stage of the project. As a general rule of thumb, we would choose a Class to represent generic concepts; Sub Classes are one or more specialised classes depicting a subset of the generalised concept and Attributes for the specific items of data that can be collected for a class in the Data Model. Each attribute has a name, and such decisions can be changed during phase 2 of the project as more information is brought to light across the ESOs.

There was a request to finalise agreement on Subclasses as a minimum set in Phase 2 and a questions as to whether Sub-Classes can be expanded upon. As the business environment changes Subclasses can be extended e.g. a new subclass of material could be created to describe a new technology.

There is debate as to whether to use class or attribute. The following is an example put forward, to explain a preference for the use of attributes instead of class for Cause and Outcome.

While the implementation of Cause and Outcome as classes would provide a level of tangibility to the real world experiences for the benefit of senior management, it also provides unnecessary complexity by attempting to create a physical representation instead of taking the inherent advantages of report generation.

For example, one might wish to assess the outcomes of a fire education program in secondary schools;

(i) immediately after the event via a questionnaire to determine understanding of the material presented, and

(ii) look at subsequent rates of arson by children within the relevant age bracket to determine the benefits of the education activity.

The class approach to outcome requires either

(i) separate sub classes to be developed for each of the possible outcomes or,

(ii) multiple attributes to be developed for a single master outcome class. Either of these would then be linked to the relevant class which, in the example above, one might presume should be Activity.

In contrast, the use of attributes within the proposed classes provides for a closer and more relevant relationship.

For the education activity an attribute of understanding might be implemented (either against the activity, or against parties to the activity) while for the rate of arson one would use the attribute of age of parties involved in arson incidents.

In this way the outcomes of the fire education program are easily assessed via reporting

(i) through the selection of all high school education activities in a defined timeframe and averaging (weighted or otherwise) levels of comprehension by students, and

(ii) selecting all arson incidents involving secondary school aged parties across two comparable time frames, pre and post education.

The three models can be refined and rationalised further and in more detail as each agency continue testing during phase 2.

3.7.3 Phase 2

Will the core data develop the data dictionary but also the proposed schema?
Yes it will inform the data dictionary. The ABS believes that more collaborative work is needed by agencies to test the agreed model against the various scenarios agreed to by the group to inform the data dictionary in Phase 2.

ABS Recommendation: The conceptual model remains a living document that can continue to change as recommended nationally by the various parties.

For the Steering Committee: No further action at this stage

3.7.4 Project, Program and Portfolio

Overall there is support shown for the Portfolio, Program and Project subclasses being included and attached to the Activity Class.

For the Steering Committee: No further action at this stage

3.7.5 Legislation and policy

There has been a comment that Legislation and policy are not as important to warrant a Sub - Class.

Among the ESOs, these two subclasses where not seen as a crucial for the development of the data model for activity reporting by ESOs across the PPRR spectrum. However it was stated that the ESOs may do some “related Activity to implement policy or legislation”. ABS suggests that these two Sub-Classes be taken out of the model and this information could still be kept as an attribute of Portfolio or Program.

For the Steering Committee: No further action at this stage

3.7.6 Activity

A class for Activity as it is the key to explaining what we do, and why we do it. All jurisdictions agree and this will be included.

For the Steering Committee: No further action at this stage

3.7.7 Incident

Support has been given for Incident as a Sub-Class of Activity.

This is how Incident sat in the original model. However it was decided at the June meeting to combine the Event and Incident Classes and this has now known as Cause Class. Across the ESOs, events and incidents are perceived to trigger work across the PPRR spectrum.

For the Steering Committee: No further action at this stage

3.7.8. A right to reply

A few jurisdictions felt that they needed a right of reply to any significant changes proposed by other jurisdictions and did not want to be totally locked in to the Model as yet.

The ABS suggests that all jurisdictions and agencies sign off on at the beginning of Phase 2.

ABS Recommendation: The ESO environment is not a static environment and as the ESO environment changes so should the ESO model

For the Steering Committee: No further action at this stage

3.7.9 Email address as a Sub Class of Location.

A question was raised as to why email address was not included as a subclass of Location. Currently Location consists of subclasses to cover Postal Location and Physical Location. Email addresses are not attributes of locations. Email addresses are attributes of organisations, roles within organisations, and individuals. Organisations, roles and individuals are included in various communication strategies. Emails are just one of many communication channels available.

ABS Recommendation: This is a back room function related to Customer Relationship Management Systems and Communication strategy.

For the Steering Committee: No further action at this stage

3.7.10 Definitions of Classes

There is a need to ensure that terms used are clearly defined

The ABS has provided definitions which originally came from EMA and agencies. This report includes models from other agencies with their definitions. All agencies need to agree to definitions to core classes to move into phase 2

ABS Recommendation: All agencies agree on definitions to core classes.

For the Steering Committee: Action required.

3.7.11 Outcome

Several agencies have requested that Outcome would be more neatly captured as attributes of a Class rather than a Class. Various agencies stated that there should be no outcome class.

The inclusion of Outcome class was decided at the 22/6 meeting and added by ABS, but it seems like there are variances of opinion of whether this should be a class or attributes, or whether it should be captured at all.

The ABS has become aware in this exercise that there are varying points of view of what Outcome means. The ESOs will need to decide on what they see Outcome as meaning. Outcomes are complex. On the one hand outcomes are the result of years of data capture as you try to demonstrate a relationship between a certain type of input/output (e.g. more building inspections) and an outcome (e.g. safer communities)... its a calculation derived from analyses of the inputs/outputs over a period of time compared to a baseline data (before the change). But in Alternative Model 3 Outcome is used to mean a result of an Event, Response or Activity e.g. an injury resulting from hazmat exposure.

The Outcomes vary significantly across and within organisations. Various levels of staff are accountable for achieving a variety of outcomes. Outcomes are generally measured by quantitative means, such as by surveys or qualitative means such as focus groups etc. Such indicators are calculated or evaluated from data collected on a day to day basis from business

activities and through the collection of survey data. The conceptual model supports the collection of such information. This data would then need to be analysed to see if the outcome has been achieved.

ABS Recommendation: Outcomes are implemented as attributes and that the right information needs to be captured in the model to provide data that is measureable and to provide evidence for the ESOs outcomes. Details of such attributes will be defined during Phase 2 of the Data Dictionary project.

For the Steering Committee: To consider when selecting model

3.7.12 Relationships

It has been raised that various Classes can have established relationships with each other as this ensures maximum flexibility. And key relationship principles of the model are maintained. These being: classes can have relationships with any other class (Rule 1), and each class is capable of a linking relationship with itself (Rule 2).

In the current model there are Class Relationships and Linking Relationship Class. These names were changed from the original model to simplify the model for comprehensive reasons. Refer to 4.1.2 for further information. Although the naming convention of the relationship classes have been simplified, in the next phase the relationship classes will need to be teased out again for the data dictionary work.

ABS Recommendation: In phase 2 that the relationship classes are expanded back out to individual classes so that all attributes can be shown.

For the Steering Committee: No further action at this stage

3.7.13 Effect Class

There are key semantic differences between the agencies. Effect is used in a number of different ways along the course of obtaining an agreement to the draft model.

Effect as core class exists in Model 1 and Model 2. It is represented by Event in Model 3
Possible ways forward;
1. Leave Effect as core class; or
2. Replace Effect with Event core class.

ABS Recommendation: ABS is aligned with the group moving semantically from Event to Effect and therefore recommends option 1 i.e. leaving Effect as a core class
For the Steering Committee: To consider when selecting model to move forward

3.7.14 Cause

There has been a comment that Cause should not be a separate class as Cause is inseparable from the Incident. Cause can be an attribute of Incident and Activity.

Again at the June meeting it was decided to combine the Event and Incident Classes and anew class has been made called Cause. Cause could be defined as a matter to be resolved; something that gives rise to action, phenomenon or condition e.g. cyclone, bushfire, flood, training, policy, legislation.

Cause as a core class exists in Model 1 only. Responses from ESOs, including suggested Models 2 and 3, would indicate a general agreement across the group that Cause is better captured in the model via attributes rather than as a core class.

Possible ways forward:
1. Leave Cause as a core class; or
2. Remove Cause as a core class.

ABS Recommendation: ABS supports the general view across the group that Cause would be better represented by attributes than as a core class and so recommends option 2, remove Cause as a core class.

For the Steering Committee: To consider when selecting model to move forward

3.7.15 Event Class

Event as a concept and core class exist in Model 3 only. Although Event was originally recognised as a key concept by ABS early on in Phase 1 of the project, it has been replaced by the Cause concept in Model 1, the Effect concept in Model 2 and remains as is in Model 3.

Possible ways forward:
1. Leave Event as core class;
2. Replace Event with Cause core class; or
3. Replace Event with Effect core class.

ABS Recommendation: ABS views Event and Effect as broadly the same concept and therefore recommends option 3 i.e. replace Event with Effect, as suggested in Model 2. Option 1 and 2 are not recommended on a semantic basis i.e. the group as a whole has agreed to move from using the terminology Event to using the term Effect. Cause is addressed via reporting of attributes rather than as a core class

For the Steering Committee: To consider when selecting model to move forward

3.7.16 Response Class

Response, as a core class, has been introduced by NSWFB in this round of consultancy to "provide information about the decision of what type of activity to undertake and which resources to commit".

Possible ways forward:
1. Add Response as a core class; or
2. Replace Response with Activity core class.

ABS Recommendation: Response will require discussion by the Steering Committee to determine the best way forward. ABS initial view would be to recommend option 2 i.e. combine Response with Activity in this model and call Activity.

For the Steering Committee: To consider when selecting model to move forward.

In conclusion the areas that require action by the Steering Committee are: Outcome; Effect; Cause; Event; Response and Class definitions.

3.8 Subclasses

While the top level diagrams do not show the Sub Classes some suggested Subclasses are:

Table 4: Subject Areas (Core Classes) and Subclasses

Subject Areas (Core Classes)	Sub Classes
Cause	**No sub classes**
Effect	**No sub classes**
Activity	**Project** – an area of Activity serving a Program.
	Procedure – a procedure for a distinct task.
	Program – a set of projects, activities, or services
	Portfolio – related matters usually for a Minister.
	Legislation – laws
	Policy – a course of action by organisations
Outcome	**No sub classes**
Location	**Postal Location** – postal address.
	Physical Location – a geophysical location.
	Electronic Location – web sites, document addresses, data bases and other electronic material locations
Material	**Equipment –** equipment used
	Hazmat – Hazardous material.
	Natural Environment – e.g. trees, forests, cliffs, lakes.
	Structure – includes buildings, bridges, fences
Party	**Individual –** features of humans and non humans.
	Person – any person associated with an activity.

In table 4 currently the Sub Classes of Project, Program and Portfolio are attached to Activity. Some agencies already use “program and projects” and this area is aspirational for many, and may be required in the future. The Class that a Project, a Program and Portfolio need to be attached to returned some divided response during Advisory Group consultation. Some thought it should stay in Activity, as these are indeed activities in mostly the non response categories of PPRR. Others felt that they should be put in their own Class. This issue will need to be resolved as part of the next round of consultation. Also some of the relationships may need to be qualified, before business rules are set in place. These can be refined during the Advisory Group and Steering Committee consultation.

3.9 Examples of what data models can collect

- The relationship between multiple incidents, events and activities; for example a road crash leading to a chemical spill and a bush fire;

- The location of materials and responsibility over a time interval; for example, inventory tracking of high dollar or critical equipment;

- Metrics such as:

- The amount of times a particular type of equipment was used for a particular incident;
- The number of incidents an individual or station has attended;

- The number and type of community events run by each organisation over a time period; and
- The number of incidents occurring at a particular location with a particular group of people.

- Tracking of an incident over a time interval across multiple regions e.g. a bushfire that is spreading;

- The environmental conditions of an incident or event (e.g. terrain, hazardous conditions);

- The involvement of different parties in an incident;

- Ability to describe people at a particular location for an incident, event or an activity;

- Education and training of emergency services personnel;

- Tracking of the projects and programs conducted in emergency management for operations management and strategic planning purposes;

- The portfolio of work managed and its relationship with policy and legislation;

- Demographic information; and

- The relationships between different parties, such as between ESOs and other organisations.

3.10 Examples of Attributes

In the Tables below are examples of relevant attributes against some of the Classes.
These examples of attributes show how you would define the various characteristics for each Field. These attributes will be a starting point for Phase 2 when the Data Dictionary is created. The Data Dictionary will include Attributes such as Descriptive Name, Definition, Purpose, Type, Min and Max characters (if required), Any constraints, and Examples of use and Code Lists.

Table 5: Summary of Activity, classes and types of attributes

Activity	
Activity class and subclasses descriptions	**Examples of attributes**
Activity – Anything an ESO does either in delivering services or supporting its own business. A data type or class for a single or set of related actions, or process steps, the state of action.	ActivityTypeCode: The activity type code specifies the service conceptually by using a code from a coding system. The activity type code or "name" is a handle on the concept of the action, not on the individual action instance. Different coding systems cover different kinds of activities, which is why there is not one single coding system to be used for the activity type code. ActivityId or Activity Identifier: unique identifier for an Instance of the Activity class ContextTypeCode: The activity (corresponding to a verb) may be conceived as an event that happened (fact), an ordered service (command), a possible service (master), an algorithm for describing an event (definition), and a goal of activity (intent). This attribute would include explanation of how the context code is served. DescriptiveText – freetext to supplement the other code fields in describing the class. ActivityGrouping – a kind of activity, e.g. P, P, R, or R ActivityStatusCode – A code for the state of the action. Not classificatory or context code. Examples of ActivityStatusCode are “intended”, “ordered”, “in process”, “completed”. DateTimeInterval – start and end time stamp information with open and closed flags at both start and end of the interval. PriorityTypeCode – can be used for auto prioritizing activities. The data set is unknown. *Other attribute examples* ActivityIdentification – an identification that references an activity. ActivityCategoryText – a kind of activity, e.g. P, P, R, or R ActivityDateRepresentation – interval based timestamp information. ActivityDescriptionText - a description of an activity. ActivityName - a name of an activity. ActivityStatus - a status of an activity. ActivityReasonText - a reason for an activity. ActivityDisposition - a result or outcome of an activity.
Project – an area of Activity serving a Program	ProjectName: a freetext identifier for a project instance
Procedure – a named procedure that performs a distinct task	ProcedureTypeCode: a code value to classify a procedure. For example via a specialist manual. ProcedureSourceTypeCode: code for supporting evidence for procedure content.
Program – i. a data type for a set of projects,	ProgramParty A Party who attends a program. ProgramAction A project or service of a program. ProgramCapacityText A master list of those Entities that are designated and

activities, or services intended to meet a need. ii. a 'vehicle' for government and agencies to achieve the intended results of outcome statements	that can be enrolled in a program. Time stamped information. ProgramCondition A condition that must be met in order for an entity to remain in a program. ProgramFacility A place – there could be others - where a program is located. ProgramPubliclyRunIndicator – a Boolean or Flag Indicator. Set to True if a program is run in the public sector; false if the program is run privately. ProgramPurposeText Freetext description for a purpose (intent) or reason for a program. ProgramReferral A recommendation or mandate for a Party to attend a program. ProgramAdministrator An entity that runs a program. ProgramRelease A manner by which a Party left a program. ProgramSupervisor An entity that oversees and manages a program. ProgramResidentialIndicator True if a Party is employed directly by a program; false otherwise.
Portfolio – a set of related matters on a specific topic usually with responsibility for it assigned to a Minister, may include multiple programs, beside independent collective management of risk.	PortfolioInput – how another entity (for example a program or a project) is positioned in the portfolio. PortfolioOutput – ddiscrete services or products for external customers or consumers produced by agencies with funding from the Government. An example of aggregation of information to Portfolio level is in documents such as the Ministerial Portfolio Statement – Department of Community Safety, Qld
Legislation – 'laws for the peace, order and good government.'	LegislationTargetSectorCodeSimpleType: a data type for the broad categorization of infrastructure type. Examples of legislation: * enumeration - Command Post; * enumeration - MASS - Mass Gathering Location; * enumeration - ENTMT - Entertainment Venue; * enumeration - CULTR - Cultural/Religious/Ethnical; * enumeration - CORR - Correctional Location; * enumeration - LIVSTK – Livestock; * enumeration - UTL – Utilities; * enumeration - OTHR – Other; * enumeration - PRSN – Person; * enumeration - POP – Population; * enumeration - NATRL - Natural Threats; * enumeration - EDU – Education; * enumeration - CSTL - Coastal Facilities; * enumeration - NCLR - Nuclear Facilities; * enumeration - RETL – Retail; * enumeration - MFG – Manufacturing; * enumeration - SPCFXN - Special Function; * enumeration - DAMS – Dams; * enumeration - GVTBLDG - Government Facilities; * enumeration - COMM - Commercial Assets; * enumeration - MNMT - National Monument, Icon; * enumeration - WATR – Water; * enumeration - TRANS – Transportation; * enumeration - HLTH - Healthcare, Public Health; * enumeration - MAIL - Postal, Shipping; * enumeration - TELCM – Telecommunications; * enumeration - IT - Information Technology; * enumeration - EMRG - Emergency Services; * enumeration - ENRG - Energy, Utilities; * enumeration - DFNSE - Defence Industrial Base; * enumeration - HAZMAT - Chemical, Hazardous Material; * enumeration - FIN - Banking, Finance; * enumeration - AGRI - Food, Agriculture, Livestock; * enumeration - CHEM – Chemical
Policy – a course of action by organisations with respect to a particular subject matter (subclasses of policy are possible through macro/micro linkages).	PolicyTargetSectorCodeSimpleType: A data type for the broad categorization of legislation via the type (it could be infrastructure, an interval a project) it applies to. For enumeration examples see Legislation – similar attributes could be used.

Table 6: Summary of Location, classes and types of attributes

Location Information about geographical addresses associated with Activities, Parties or Materials	
Location subclasses descriptions	**Examples of attributes**
Postal Location - a set of precise and complete data elements that cannot be subdivided and that describe the physical location of a place. A data type for a geophysical location described by postal information. The postal address of a location as would be used by Australia Post.	Street: The street portion of an address (structured) StreetLocation The AbstractStreetLocatorType is an abstract type for describing the location on a street within an AddressType. It could be done this way because the components of a location on a street vary greatly. So that the schema can accommodate this variation there should be created a set of derived types such as the BuildingLocatorType which has the components for an apartment or suite or floor within a building.
Physical Location - is a data type for a geophysical location, that is the physical address of a location. This may include GPS coordinates and any other items that would describe a particular location.	LocationAddress A geophysical location described by postal information. LocationAddressGrid A location identified by a unit of a grid system overlaid on an area. LocationAltitudeMeasure A measurement of the height or position of a location above a certain reference. LocationArea A location identified by geographic boundaries. LocationCategory – classificatory attribute is hypsography standards are sought to be used LocationContactInformation Contact information for a location. LocationCrossStreet A location identified by two or more streets which intersect. LocationDepthMeasure A measure of the depth of a location. LocationDescriptionText A description of a location. LocationGeographicElevation A measure of the distance of a point on the Earth from sea level. LocationHighway A major public road. LocationLandmarkText A distinguishing physical feature at a location. LocationLocale A geopolitical area. LocationMapLocation A location identified by map or grid coordinates. LocationMGRSCoordinate A co-ordinate from the Military Grid Reference System (MGRS) which represents a location with a Universal Transverse Mercator (UTM) coordinate and a unique military grid square. LocationName A name of a location. LocationRangeDescriptionText A description of the boundary or range of a location. LocationRelativeLocation A location identified by its proximity to another location. LocationSurroundingAreaDescriptionText A description of the immediate area around a location. LocationTwoDimensionalGeographicCoordinate A location identified by a latitude and longitude. LocationUTMCoordinate A co-ordinate from the Universal Transverse Mercator (UTM) Coordinate System, which represents a location with a grid zone, an easting value, and a northing value.

Table 7: Summary of Material, classes and types of attributes

Material Information about equipment e.g. fire trucks and breathing equipment, hazmat, structures e.g. buildings and bridges, and the natural environment e.g. rivers and mountains.	
Material class and subclasses descriptions	**Examples of attributes**
Equipment is material used by parties. Any equipment that is used in the course of emergency services management. Examples include, rescue equipment such as a fire truck, hoses, personal protective equipment.	StatusCode; GoodsEquipmentCode enumeration could include Personal Protective Equipment, Operational and US&R Equipment, Information Technology, Communications, Detection, Decontamination, Medical, Uncategorised Products Weight; Dimension; Mass; Manufacturer; Quantity; HandlingInstructions; StockNumber; EffectiveDuration Useby date for the equipment. May be useful life of the equipment.
Hazmat - Hazardous material such as hazardous chemicals, naturally occurring or processed.	HazardousMaterialIncidentProduct Product involved in hazardous materials incident HazardousMaterialIncidentPlacardedIndicator Hazardous Material shipment was placarded HazardousMaterialIncidentShippingPapersIndicator Hazardous Material Shipment papers / waybills accessible HazardousMaterialIncidentTransportationInterruptionIndicator Hazardous Material Incident interrupted transportation indicator HazardousMaterialIncidentAircraftAlertedIndicator Hazardous Material Incident aircraft alerted indicator HazardousMaterialIncidentRadioactiveContaminationIndicator Hazardous Material Incident involved radioactive contamination HazardousMaterialIncidentInfectiousSubstanceIndicator Hazardous Material Incident involved infectious substance HazardousMaterialIncidentMarinePollutionIndicator Hazardous Material Incident involved marine pollution HazardousMaterialIncidentReportableIndicator Hazardous Material Incident reportable per DOT 171.15 definitions HazardousMaterialIncidentReportableRationaleText Why Hazardous Material Incident reportable per DOT 171.15 definitions Example of attributes from FEMA MultiHazard model: HazmatTypeCode: ChemicalAgentIncident; CorrosiveMaterialIncident; ExplosiveIncident; FlammableGasIncident; FlammableLiquidIncident; FlammableSolidIncident; HazardousWhenWetIncident; NonFlammableGasIncident; OrganicPeroxidesIncident; OtherhazardousMaterialIncident; OxidizersIncident; SpontaneousCombustionIncident; ToxicAndInfectousIncident; ToxicGasincident; UnexplodedOrdnanceIncident
Natural Environment Describes non man made materials such as trees, forests, cliffs, lakes, rivers, and mountains.	RiskCode Any information associated with the risk of a natural disaster or any other disaster occurring is classified here. E.g. fire danger index, flood risk, risk of land slide and state fuel load; Density Concentration measures for material; Volume; Mass
Structure Any man made material excluding equipment or hazardous material. Structures would include buildings, bridges, fences, and walls.	RiskCode; HandlingInstructions; HandlingCode; Manufacturer; Quantity; Hypsography; Hydrography; Roads and Trails; Railroads; Pipelines; Transmission; and Miscellaneous Transportation Features; Manmade Features

Table 8: Summary of Party, classes and types of attributes

Party Information about participants of emergency service related activities e.g. people, organisations, livestock.	
Party class and subclasses descriptions	**Examples of attributes**
Party describes different groups or individuals that have some relationship with an activity. They may be a formal or informal organisation such as a government agency or a local community. A party may be a human being or an animal.	PartyIdentifier: an instance identifier for the party
The **Individual** subclass describes the common features of humans and non humans; date of birth, date of death and sex.	SexCode:
A **person** is a human being. A person may be a volunteer fire fighter, a member of the community, a victim, a paid emergency services worker. It describes any person that may have an association with an activity, incident or event.	FirstName Surname EthnicityCode RaceCode OccupationCode
Non-Person subclass is used for modelling a single animal such as a pet or working dog or Canine Unit dog, livestock, bird etc.	SpeciesName
Organisation subclass provides a generic description for any type of organisations	OrganisationName
Formal organisation subclass is to model any official organisations that are publicly recognised and have a formal structure. These may be a government department, a private company, a small business, a school, charity organisation, etc.	IndustryCode: Australian and New Zealand Standard Industrial Classification
Informal organisation subclass is to model any group that is not official nor officially recognised or registered. Examples of this are the local community, neighbourhood, a group of volunteers that may come together to assist in a major catastrophe.	GroupTypeCode: this could be a categorised along subject area lines to denote the nature of the grouping, for example People > Community group, or People > Over 65, Location > Inner City etc InstanceIdentifier: informal organisations can be short lived and be very specific so many instances will exist which need to be identified InstanceDescription: freetext to assist with the purpose of the raising of the instance of this class

Table 9: Summary of Association, classes and types of attributes

Association, classes and types of attributes	
Class Relationship	**Examples of attributes**
Participation is 2 (or more) different class instances 'working together', or 'participating' in one another. These interactions are distinct enough to warrant classes be formed that typify them. Here a Party is working with an Activity. **Class Relationship** describes a party being related to a particular activity over a time interval. For example, a fire brigade platoon engaged in fire fighting For example, Strike Team X is doing Firefighting. The Party Strike Team X could also be Rescuing too, as many Activities can be done by the same Party.	Class RelationshipRoleType: Code indicating the role of the participant in a activity DateTimeRange: time interval the participation is deemed to be in existence for, and so can be open or closed at both ends of the interval.
Class Relationship	**Examples of attributes**
Relationship classes relate the same kind of entity. Describes the relationship between different parties over a time interval. This may be used to describe the relationship between different stations and their responsibilities for different areas of the state or territory they are in. A Strike Team X Party can be related to an Party comprised of interstate brigade of rural volunteers and an associated Hazmat Specialist assigned to the Party	RelationshipTypeCode: describes the type of relationship between two parties. It may be an association, a sub-party, derived party. For example a fire fighting platoon may receive Hazmat training and thus become qualified in handling hazardous materials. DateTimeInterval: time interval in which the party relationship exists.

Class Relationship	Examples of attributes
This class is about recording of related activities over a time interval. Class Relationship is typically in the form of: • Composed of; • Associated; or • Causes of For example, a road crash causes a fire which causes an explosion. Thus we have multiple incidents that are related. Think of an example of Firefighting Activity where Rescue Activity is also going on. Class Relationship Class is used for composition, cause, and 'other' referential (or association) relationships between Activity Class Instances. For example: A Firefighting Activity is coupled or referred to with a Rescue Activity; This Rescue Activity above is related, coupled up with, or referred to with the Firefighting Activity. You can look at the relationship of the 2 activities, by considering the two activities in either order, for whatever reason.	Class RelationshipType: Relationship type codes could be: Class Relationship TypeCode: "is composed of": E.g. A Firefighting Activity could be composed of Firefighting Activity, several instances, Mobilisation Activity, and including several instances of this, including perhaps Activity for Trucks, Aircraft (Fixed Wing), Helicopters etc. Class Relationship TypeCode: "causes": E.g. assuming in the example of the Firefighting there are 2 Parties (a ground Brigade of fire fighters and an Aircraft), a Notification Activity could "cause" an Activate (order to take off) Activity to the Aircraft Party which would then "cause" a Move Activity of the Aircraft moving to the fire fight zone. Class Relationship TypeCode: "associated": two activities could be associated without composition or causation reasoning. Mobilisation activities for a number of volunteer brigade personnel, across many brigades, in response to a large response operation, could be 'rolled up' or associated together. Class Relationship DateTimeInterval: time interval the relationship is deemed to be in existence for, and so can be open or closed at both ends of the interval.
Class Relationship	**Examples of attributes**
Participation is 2 (or more) different class instances 'working together', or 'participating' in one another over a time interval. These interactions are distinct enough to warrant classes be formed that typify them. Here an Activity is working with a Location. For example, Firefighting, at 63 Appleseed Street. There could also be Rescuing at 63 Appleseed Street too, as many activities can be at the same location.	Class RelationshipTypeCode: a code for what describes the relationship between an activity and the location. Class RelationshipDateTimeRange: time interval the participation is deemed to be in existence for, and so can be open or closed at both ends of the interval.

Class Relationship	Examples of attributes
Describes an association between two locations over a time interval. It may describe the link between multiple locations such as the lake is next to the hospital or it may be used to link a physical and postal location.	Class RelationshipTypeCode: Indicates the type of relationship between the two locations. E.g. "same as", "adjacent to" DateTimeRange: The period of time during which the relationship between the two locations instances is effective.
Class Relationship	**Examples of attributes**
Participation is 2 (or more) different class instances 'working together', or 'participating' in one another over a time interval. These interactions are distinct enough to warrant classes be formed that typify them. Here a Party is working with a Location. Party Location Participation is the location of a party or a party in a particular location over a particular time interval. For example, a permanent fire fighter might work at the Parramatta NSW Fire Brigades station. For example, X Strike Force is at 63 Appleseed Street. There could also be Rescuing at 63 Appleseed Street too, as many activities can be at the same location.	Class RelationshipTypeCode: The location of a party or a party in a particular location over a particular time interval. For example, a permanent fire fighter might work at the Parramatta NSW Fire Brigades station. DateTimeRange: time interval the participation is deemed to be in existence for, and so can be open or closed at both ends of the interval.
Class Relationship	**Examples of attributes**
Describes an association between material (or thing) and the location (place) over a time interval.	Class RelationshipIdentifier: instance identifier for the particular material location participation in question DateTimeInterval: time interval the participation is deemed to be in existence for, and so can be open or closed at both ends of the interval. Class RelationshipTypeCode: use a code to determine the nature of the participation between 'thing' (Material) and 'place' (Location). Enumeration examples: "is composed of", "is intended for", "is removed", "it is assigned", "is destroyed", "has gained condition", "has produced". Examples: transport of equipment, building codes, smoke, debris, fire

Class Relationship	Examples of attributes
A class to model who has responsibility over the material over a time interval, such as whether they are owners or just users of the material. E.g. one particular station may have ownership of a truck but it has been temporarily loaned to another station.	Class RelationshipTypeCode: a code to determine the nature of the responsibility. While the terms used should be simple, everyday language, the type codes themselves could be tied to business rules to enact the detail of the responsibility (for example if a transfer of ownership is triggered, the online form and signoff could be notified by email etc). Enumeration examples: **"owned by/owns" :** As in, Truck X is owned by Brigade Y, Brigade Y owns Truck X; **"being serviced by/ servicing/" :** As in, Truck X is being serviced by Brigade Y, Brigade Y is servicing Truck X; and **"in custody/in the custody of" :** etc DateTimeRange: time interval the responsibility is deemed to be in existence for, and so can be open or closed at both ends of the interval.
Class Relationship:	**Examples of attributes**
Describes the relationship between different materials, including equipment, structures and the natural environment over a time interval. E.g. a heavy pumper full of water shows the relationship between the equipment and a natural material, or breathing apparatus (equipment) stored on a Hazmat fire truck (equipment).	Class RelationshipTypeCode: code to describing the relationship between materials. For example, a fire truck may contain various kits, replacement valves. Enumeration examples: "kits/ kitted by"; "fuels/ fuelled by"; "covers/ covered by". DateTimeRange or DateTimeInterval: an attribute that records when the relationship between materials starts and ends. Can be an open ended time interval.
Class Relationship:	**Examples of attributes**
Captures the relationship between an activity, party, material or location. The target of an activity can be any party or material. It 'focuses' or 'targets' activity onto material, parties, location. Important to note that Activity is the only requirement, the other 3 core classes are optional and all may be present or combinations may be presented. E.g. a victim that is being rescued from an incident is a target of the activity.	Class RelationshipTypeCode: this is to determine the nature of the targeted participation. Class RelationshipTypeCode: if there are Parties involved in the TargetParticpation, this code could be used to record a judgement of how aware the various parties are of their participation. For example a victim could be conscious, or they may be partially conscious or they may be resisting a rescue (for whatever reason)

Source:
Incident –HomelandSecurityOperations Incidents schema leaf, National Information Exchange Model http://www.niem.gov/niem/releases

International Association of Fire Chiefs material and databases.

Department of Homeland Security administer the Geospatial Data Model which includes the NIEM, including the references to NIEM and IAFC:
http://www.fgdc.gov/participation/working-groups-subcommittees/hswg/dhs-gdm/version-2-7

4.0 Testing the Draft Data Model

The following are some scenarios both real world and fictitious that have been used to demonstrate how a model is applied. This example is not on one of the 3 proposed models, but is useful in showing how everyday emergency situations can be worked through the model classes.

Table 10: Examples of Scenarios

Scenario Text	Scenario Text Reinterpreted in Data Model Terms. This example is not on one of the 3 proposed models.
3.1 Prevention Scenario*:*	
Much planning and preparation went into educating the community on plans for preventing fires in the bushfire prone regions of the Adelaide Hills. Community education programs including discussion forums, leaflet drops, house visits and radio announcements were made to educate residents on the importance of being prepared for the bushfire season. Residents were encouraged to minimise fuel loads around their homes, check that their fire extinguishers and other equipment were serviced and ready for use, ensure they had evacuation plans ready including the nearest designated fire refuge, ensured they understood the warning messages for evacuation and were prepared early on as to whether to stay and defend their property or to evacuate. Visits were conducted to vulnerable residents such as the elderly and the disabled to advise them of evacuation plans in the event of a fire danger.	Much planning and preparation (Portfolio and Program management) educating the community (Activity) in Adelaide Hills (Location). Community Education Programs (Activity, Program) including (discussion forums, leaflet drops, house visits and radio announcements - each are an Activity) were made to educate residents (Party, residents could be considered an Informal organisation) Residents (Party) were encouraged to (minimise fuel loads (Material) around their homes, check that their fire extinguishers and other equipment (Equipment) were serviced and ready for use, ensure they had evacuation plans ready including the nearest designated fire refuge, ensured they understood the warning messages for evacuation and were prepared early on as to whether to stay and defend their property (Material, Structure) or to evacuate - each of these are Activity). Visits (Activity) were conducted to vulnerable residents (Informal) such as the elderly (Party) and the disabled (Party).
Back burning was conducted in the Adelaide Hills region and in conjunction with the local council designated fire refuges were cleaned up to ensure they were safe from possible fires.	Back burning (Activity) was conducted in the Adelaide Hills region (Location) and in conjunction with the local council (Formal organisation) designated fire refuges (Location) were cleaned up to ensure they were safe from possible fires.
Council was lobbied to review planning legislation around building in bushfire prone areas.	Council (Formal organisation) was lobbied (Activity) to review planning legislation (Legislation) around building in bushfire prone areas.
Education campaigns on the dangers of unintentional arson (such as irresponsibly discarding cigarette butts) were also advertised on television and radio. It included comments from the state premier on the dangers of this.	Education campaigns (Activity) on the dangers of unintentional arson (such as irresponsibly discarding cigarette butts) were also advertised on television and radio.

Groups prone to arson were also targeted in education and other campaigns to prevent offending or re-offending. Despite consecutive days with temperatures over 40 degrees, the summer of 2008 went with little in the way of fire incidents. Several small fires did occur but were contained very quickly. Prevention efforts succeeded in ensuring that no major fire outbreaks occurred. (source: ABS, fictitious)	Groups prone to arson (Party, Informal organisation) were also targeted in education and other campaigns (Activity, Class Relationship) to prevent offending or re-offending. Several small fires (Incident) did occur but were contained very quickly (Activity). Prevention efforts succeeded in ensuring that no major fire outbreaks occurred.
3.2 Preparedness Scenario: A review of inventory for the Country Fire Authority has shown that pieces of equipment including breathing apparatus, fire fighting hoses, extinguishers, and extrication implements were approaching the end of their useful life. By legislation tracking and maintenance of some of this equipment must be recorded. Some equipment must be decommissioned upon reaching a specified age. Each station is assigned with the task of decommissioning equipment and sending others that require maintenance to the maintenance team. An order is made for any equipment that is decommissioned. Orders that are above $15,000 are to be approved by the station officer. (source: ABS, fictitious)	A review of inventory (Activity) for the Country Fire Authority (CFA Review = Class Relationship, CFA Review of certain actual Inventory somewhere = Class Relationship) Equipment including breathing apparatus, fire fighting hoses, extinguishers, and extrication implements By legislation (these are specialisations of Activity which accounts for Activities that are defined, commanded and have certain intent) tracking (Class Relationship and Class Relationship) and maintenance of some of this equipment must be recorded. Some equipment must be decommissioned (Activity context type code is 'definition', this classes used could be specialisations and modelled to Project, Program and Portfolio levels) upon reaching a specified age. Each station (Class Relationship probably the brigades at the station, they would have to be assigned to the station first) is assigned with the task (then Class Relationship, then as the equipment's location is not recorded) of decommissioning equipment and sending others Activity that require maintenance to the Party maintenance team. An Activity order is made for any Equipment that is decommissioned. Orders that are above a specified limit are approved by the Party station officer. Specified limit may be described in a Procedure class or it could be part of Policy or Legislation.

3.3 Response Scenario It's 6am on a Friday morning in December. We have been experiencing spate summer weather conditions, with lots of storms and bad weather. A heavy thunderstorm has just started where you live. At 06:17am, lightning strikes the local plastics factory, causing a huge explosion. The early shift started in the factory at 6am. The explosion causes a fire in the ground floor of the factory. The building is close to the main road going through town. NSW Fire Brigades is notified of the incident through the communications centre. The nearest brigade is dispatched to the location of the incident, in an industrial part of Bankstown. As the fire contains hazardous materials, fire fighters trained in handling hazardous materials are in attendance with the appropriate clothing and equipment.	6am Friday morning July spate summer weather conditions Activity Class Relationship of Storm Activity and Bad Weather Activity condition Multiple Class Relationship for "comprises of", "caused by" and "association" between the 'spate summer weather' condition and the 'lots of storms' and the 'bad weather'. heavy thunderstorm Activity Instance started heavy thunderstorm .... where you live Class Relationship lightning Activity strikes the local plastics factory Class Relationship (this minus the Material used above) the local plastics factory Location, plastics factory Class Relationship plastics Material, factory Material 06.17 are recorded as DateTimeRange against various classes. causing a huge explosion Activity instance is also with Class Relationship 'caused by' early shift Activity also Party started in the factory Class Relationship with 6am DateTimeRange The explosion causes a fire Class Relationship in the ground floor of the factory Class Relationship. industrial part of Bankstown is Location referential code The nearest brigade Party is dispatched Class Relationship to the location of the incident Class Relationship. As the fire contains hazardous materials Class Relationship, fire fighters trained in handling hazardous materials Class Relationship Class Relationship are in attendance with the appropriate equipment Class Relationship (where the equipment Material is). Factory workers Party are trapped in the factory Location and require rescuing Activity (command) Class Relationship (no multiplicity to Material)

Factory workers are trapped in the factory and require rescuing. Ambulance attends the scene and provides medical treatment to workers that have been rescued. A fire fighter is injured whilst rescuing a worker and is also given treatment. Due to the severity of the storm impact SES is called in to assist in the aftermath of the storm. The SES volunteers cleared the tree branches that had fallen on the road surface. (source: http://www.hantsfire.gov.uk/yoursafety/emergency/emergencyscenario.htm)	Ambulance Party attend the scene Class Relationship and provide medical treatment Activity to workers Party that have been rescued Activity. The Ambulance Party will also have Class Relationship over any specialised equipment or medication they provide. Any Material left onsite after they leave will be in Class Relationship. A fire fighter Party is injured whilst rescuing a worker Party (Class Relationship association) and is also given treatment Class Relationship, Class Relationship associations. Due to the severity of the storm Activity impact SES Party is called in to assist Class Relationship in the aftermath of the storm (Activity ActivityGrouping 'Recovery')
3.4 Recovery Scenario Storms and flooding in northern Queensland resulted in many homes and businesses being damaged. SES crew were tasked with recovering sand bags, cleaning up streets, removing tree branches. During the storms, many roofs were destroyed, and so SES was out with long ladders tarping the damaged roofs. After the storms ended, recovery operations meant that SES was out reclaiming the tarps and ropes used to patch the roofs. Insurance investigators come out and assess damage to affected homes (flood and storm damage). (source: ABS, fictitious)	Incident storms and flooding Class Relationship Queensland Location. Formal organisation SES crew specialisation of Activity (recovery efforts) recovering sand bags, cleaning up streets, removing tree branches. Incident DateTimeRange during the storms, many roofs destroyed Class Relationship SES Formal organisation long ladders Equipment tarping damaged roofs Activity Incident storms, Activity recovery operations Formal organisation SES reclaiming Class Relationship Equipment tarps and ropes Class Relationship used to patch the roofs. Formal organisation insurance investigators Activity assess damage to affected Structure homes *Note: in this example we have used specialisation classes such as Formal over the parent class Party. Either would be correct.*

5.0 Business Considerations for Data Model Implementation

It is suggested that the following steps are carried out to complete the development of the model for Implementation:

- Adoption of a Final Conceptual Data Model
- Formation of a Data Dictionary;

5.1 Adoption of a Final Conceptual Data Model

5.1.1 Interoperability

The Data Model will facilitate interoperability as it is the entry framework to a living set of standards which have been conceived and designed in such a way to maintain information exchanges between ESOs and allows their disparate systems (and potentially others) to share, exchange, accept and translate information. The type of interoperability the Data Model is conceived to facilitate the breaking down of the barriers that exist, by founding an actionable standards development framework for information sharing between ESOs.

5.1.2 Actionable standards

The Data Model actionable standards can be actively applied to all message instances between its participants (ESOs, the public, government at all levels). As a data model, it was conceived to allow the development of all kinds of software programs, software systems, and different versions of these, and to work in conjunction with them.

5.1.3 Change

The approach to building of the draft Data Model can be described as holistic, allowing for the best possible fit using the highest level concepts to allow for any ESO activity and to maximise 'future proofing' of the design. ESOs have changed and will continue to change over time, and the Data Model is designed to work with any change.

5.1.4 Simple design

By keeping the design approach simple and holistic, the modelling of the Data Model seeks to eliminate gaps that occur in processes that are 'forced to fit the classification'. Furthermore, by encompassing the data more appropriately, the Data Model will be far more effective in addressing the problems associated with accessing closed-off 'stove pipe' information systems and general inaccessibility of information. In the critical situations in which ESOs operate, and with increasing demands on mutual aid and collaboration between specialist agencies, this is envisaged to be a feature of increasing importance.

5.1.5 Information storage

This operational ability to account for data has meant the Data Model is also a way to store information, whatever state it is originally captured in, and allow for further treatment as required. In this way, the knowledge will be better retained.

5.2 Formation of a Data Dictionary

5.2.1 National Emergency Services Organisations Data Dictionary

The next step after the Data Model is to consider Phase 2 of the project, which is the formation of a Data Dictionary. The Data Dictionary should be 'business-driven' but 'practitioner-designed'. This means the recommendation is for an actionable, real life, usable data dictionary. The data dictionary should be in the language of those who are the experts in the business of emergency management, to enhance its usefulness in running emergency management organisations.

5.2.2 Data Dictionary structure and standards

The structure of the data dictionary should be one that adheres to principles of data sharing and exchange. Consideration also needs to be given to other domains that may become future partners and raises the issue of the standards needed in its creation. These standards should aim to remove barriers to information sharing and reduce the design and development time needed to build and implement a data dictionary with robust, agile information sharing capabilities using common standards, vocabulary, and reusable data components and tools. A data element registry should be an integral part of the data dictionary formation as it will complement the aims of a business driven, practitioner designed approach.

6.0 Technical Considerations for Model Implementation

It is suggested that the following are considered for technical Implementation of the model:

- Data Types
- Use of ISO/IEC 11179 Standard (International Organisation for Standardisation /International Electrotechnical Commission);
- Use of Extensible Markup Language (XML);
- Further research into standards and consultation;
- Development of a logical model;
- Development of a physical model;
- High level architecture;
- Version control; and
- Key points about use of XML in recommendations supporting the development of the data model and data dictionary.

6.1 Data Types

Phase 1 of the project does not include the description of data types. However, some examples given of data types are listed with some references to international standardisation, below. Data types are to be expanded in Phase 2 of the project.

6.1.1 HL7 Data Types

The data types shown in Fig. 16 are strongly influenced by the HL7 Data Types (Health Level Seven International, http://www.hl7.org/).

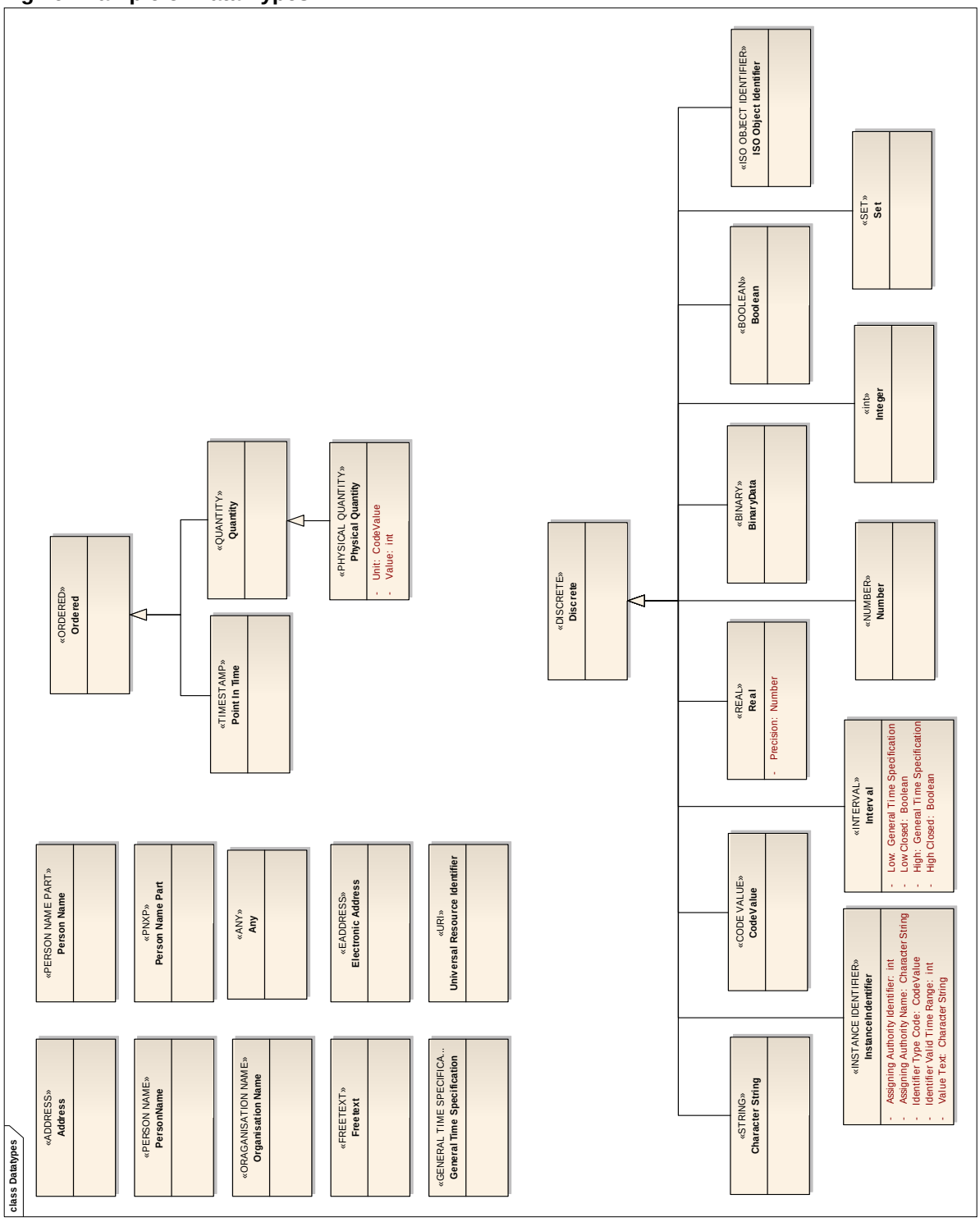
HL7 data types are used by the Health sector on an international scale and the HL7 ISO (International Organization for Standardization) and ANSI (American National Standards Institute) accredited. Proper quality considerations and rigorous feedback loops in this type of network are normal, and the data types are kept up to date (contemporary and relevant).HL7 data types were a useful starting point in showing how a set of data types might be applied to the NDMP Draft Data Model.

There are obvious equivalencies between HL7 and data types (e.g. integer, character, Boolean etc.). Relevant information can be found at:
http://i-proving.ca/space/Technologies/HL7/Understanding+HL7+Data+Types
The link: http://www.hl7.org/v3ballot/html/infrastructure/datatypes/graphics/L-dtUML-Main.gif provides a graphical, latest version of the HL7 data types. There is significant work to be done when considering how ESO data type information might work in real life and how it might be implemented.

When considering data types for the NDMP Draft Data Model consideration needs to be given to all the specialisations, translations, findings and reuse patterns that need to be explored in the HL7 data type. The interdependence of all these features is important to the overall design of data types as a data model.

ESOs would need to discuss the value of designing data types. What is described in well-designed, useful data types can only be found by asking intricate questions of all components of the model. ESOs would need to balance the time and coordination effort required in developing data types that serve all the NDMP model stakeholders, or sacrifice the opportunity for enhanced interoperability and just use common variable types that work in low level implementations at Physical levels (in databases and computer programs). The comparative cost of interoperating this way would be hard to forecast, and may not only be costly in dollar terms but also in quality assurance terms.

Fig 16 Example of Data Types



6.1.2 Draft Data Model detailed description tables

Apart from Classes, Attributes and Relationships, as the model is developed there can be additional detailed information automatically tabled (by the modelling software) as new information is accepted into the data model. This presumes that this information would be used to progress the development of the model down logical and physical stages.

Description of columns headings in the tables below:
PK: This column is where you'll find information belonging in the Logical and Physical layers of development of the model and the space should be used to indicate the stereotyped operations of the attributes. As such the PK column will, as the model is developed, see the appearance of Primary Key (PK), Foreign Key (FK), Index, Trigger, Unique and Check labels, depending on the design, and if UML notation is used.

Name: This table is for Attribute Names. Perhaps consider using the 'long', concatenated or 'camel case' attribute names (for example, ActivityDescriptionText) that retain some semantic meaning even when encountered separately from the rest of the data model. Current trends in XML attribute naming convention and/or adhering to ISO/IEC11179 see this as useful naming practice for attributes in helping convey essential information. Large classes with long attribute lists can become confusing. Since classes get much of their 'qualitative identity' from the reader digesting their attribute lists, it goes without saying that preventing this confusion helps the expressive quality of the Data Model.

Type: This column is used to identify what data type the attribute is going to implement.

Notes: If the data type is unclear, the notes section can be expanded in amount of content to not only describe what the attribute in question is, but discuss how it might work in the context of the class it belongs to and in the model itself.

6.1.2.1 Examples of Data Types:

Table 11: Example of Equipment Data Types

PK	Name	Type	Notes
	StatusCode	int	
	GoodsEquipmentCode	int	Personal Protective Equipment Operational and US&R Equipment Information Technology Communications Detection Decontamination Medical Uncategorised Products
	weight	int	
	dimension	int	
	mass	int	
	manufacturer	int	
	quantity	int	
	handlingInstructions	int	
	StockNumber	int	
	EffectiveDuration	int	Use by date for the equipment. May be useful life of the equipment.

Table 12: Example of Relationship Data Types

PK	Name	Type	Notes
	RelationshipType	int	Code that describes the relationship between the activities. The codes may be "composed of", "associated with", and "caused by".
	DateTimeInterval	int	The date time interval in which the Class Relationship exists. May have start and end time frame.

Table 13: Example of Location Data Types

PK	Name	Type	Notes
	Id	int	Assigned to an instance of a physical property.
	TypeCode	int	Type of location, e.g. resident, hospital, government building, commercial building, parkland, district such as a local government area.

Table 14: Example of Material Data Types

PK	Name	Type	Notes
	TypeCode	int	Describes what type of material it is. This would be based on classification codes for materials. For example it may be the code associated with a piece of personal protective equipment; it could be an office block, or a cliff. The codes may be based on an existing classification, such as the Building Code of Australia for buildings and other structures (e.g. fences and walls).
	DescriptionText	int	Descriptive detail of the material. May describe the age or condition of a building. It is not necessarily describing the type code and could be free text.
	Id	Interval	Unique identifier for the material instance.
	DateTimeInterval	int	An indication of the time interval during which the material is in existence

6.2 Use of ISO/IEC 11179 and XML

Creating a shared understanding of data requires a way to understand the terminology and describe the classifications used to categorise the information and the values being reported against these categories. This detailed understanding is also required to produce data in such a way that it can be easily shared, accurately understood and merged together. The user of the information also needs to understand the way information is compiled in order to make correct use of it. Without this, the meaning of the data is not clear and is open to interpretation by both the provider and the user of the information e.g. the addition of the Catastrophic category to the existing bushfire danger rating scale requires an understanding of when the different categories apply (i.e. under what conditions) and what they mean (what can be expected and how should fire protection authorities and others respond). This information needs to be widely known and consistently applied for the rating scale to be effective and also who has the authority to define or change this information. Information about the activities of protection authorities (e.g. the number of fires attended) could then be reported against these ratings.

ISO/IEC 11179 defines an international standard for establishing a metadata registry to store and manage the information stored in it (metadata). Once established, a metadata registry provides other advantages such as the ability to make the information more accessible, identifying inconsistencies across entries, reducing the number of different terms used by identifying duplicates, identifying poorly defined concepts and as a source for designing and building computer systems using consistent terminology. With computerised links to the metadata repository, reports can be produced containing information from the metadata registry that assists in the understanding of the information.

There are many examples of metadata repositories built around ISO/IEC 11179, including: METeOR from the Australian Institute of Health and Welfare (AIHW) (http://meteor.aihw.gov.au); US National Cancer Institute - caDSR (http://ncicb.nci.nih.gov/NCICB/infrastructure/cacore_overview/cadsr/ISO 11179) and the US model shows they have commenced building their data dictionary along the rigorous registry standard ISO/IEC 11179.

While the Australian Incident Reporting System (AIRS) manual provides good descriptions and some classifications around response (post incident reporting), it is missing information around prevention, preparedness and recovery. The manual is also structured in a way that it is inhibits change. The chief reason for this is the inception of AIRS as an incident oriented understanding rather than a holistic approach based on activities in preventing, preparing and recovering from responding. A top down strategy would use a conceptual framework like the one just described to create the right space and fit for all required activities.

The ISO/IEC 11179, an international standard which is used to describe data and the use of XML to implement the ISO/IEC 11179 concepts, should be adopted. ISO/IEC 11179 retains a remarkable level of intuitiveness for its elements even when separated away from context or definition. By using XML to embody the ISO/IEC 11179 naming conventions, this further facilitates the creation of a 'living' data dictionary which comprises a core where dictionary items of common understanding and use can be held. Dictionary items that are emerging, or are highly specialised, can still be accessible to all users of the data dictionary through an extension program which is available to all users. The use of XML allows for the modular ability to publish extensions additional to a core set.

6.3 Further research into standards and consultation

6.3.1 Australian and international standards

While XML and ISO/IEC 11179 describe data, there is a need for further research on proven international and Australian standards in establishing the dictionary and to cater for its core and extensions. There are potentially dozens of international standards that can be of use while Australian standards should also be considered as part of this recommendation. Australian contributions to international standards should not be overlooked. By using XML, the data dictionary can be implemented to take only what is needed from each international standard. Considerable work goes into international standards (including the United Nations (UN)) and considerable time and resources can be saved by synthesizing an Australian data dictionary by reusing huge volumes of work by related colleagues from all over the world.

6.3.2 Consultation

Use of international and Australian standards should occur with a consultation process involving all the participants and the creation of an education program for interested parties. The US national information data exchange has both online and other training courses available to promulgate how data sharing and a living data dictionary can become a reality.

6.3.3 Development of a logical model

The draft data model should then be developed into a logical model that can prepare ESOs for the deployment of the model to a physical one. Considerations of technology means that at the logical model step, those involved should include the addition of database designers and database system custodians as well as people involved in the business operation and business execution of agencies, including those at board level. Specialists in the use of internet protocols

for the exchange of XML payloads are also recommended to be involved at this stage as advisors. The consideration of enterprise architectures and the interactions with XML schemas should be considered and planned.

6.4 Development of a physical model

6.4.1 Domain and system interoperability

The logical model should then be developed into a physical model. For the logical model to become implemented with real life deployments and organisations' information systems, the model needs to address how the XML can be used to interoperate the widely varying domains and elements which occur in emergency management, e.g. everything from the ethnicity of staff to breathing apparatus, as well as the ESOs' active corporate and operational systems. These can be a varied assembly of machines and software designs that have emerged over the last twenty years or more.

6.4.2 Deployment options

When the physical model is released, it is suggested that some evident deployment options be described. There should be instructions for how the physical model will work with various version legacy arrangements, any emerging middleware toolkits, web services, popular Enterprise Service Bus (ESB) deployments, messaging and brokering systems and any similar pilot study documentation should all be included. There is a range of hardware and deployment model arrangements that should be described, as they should all be workable options for implementation which is part of the advantage and appeal of using XML technologies.

6.5 High level architecture

It is recommended that a high level architecture is described and released in line with the release of version 1.0 of the physical model.

6.6 Version control

It is recommended that, while the model is in conceptual stage, the versions are controlled in decimals for release. Once Steering Committee approval is given then a step up to version 1.0 is to be released. The same version is strongly recommended to be kept aligned for the data dictionary, and, unlike overseas examples, for these version codes to not become out of sync, irrespective of whether there are upgrades to either the data model or data dictionary or both.

6.7 Use of XML

Following are some key points about the use of XML in recommendations supporting the development of the draft data model (DDM) and data dictionary (DD):

- The DDM is conceived to support exchanges of information across domains (such as other emergency services) as well as exchanges within an organisation, or organisational domain.
- Provides a common set of reusable components which are collaboratively managed with stakeholders under governance.
- The information exchange DD is self describing, in that documentation and packaging is such that it is made available in consistent format and in a repeatable patterns. Most DD production processes will display these rigorous, but efficient, iterative approaches. Similar

overseas success stories support that this keeps the DDM/DD fresh, and cross-domain colleagues better aligned with their shared information.

- Governance processes allow ESO DDM/DD domains to manage their content and leverage existing standards, while staying true to the design of the DDM and DATA DICTIONARY (e.g. the NDR).
- The DDM/DD supports the use of external standards for use in its own sphere of interest (e.g. Building Codes, UN hazard material codes, can be used easily and without specific knowledge of the standard by an emergency service reporting officer through using the DDM/DD in a remote station in the outback).
- The DDM/DD and high level architecture will support a concept of version independence for other external standards that are used (in XML) format.
- Developers of conforming NIEM Information Exchange Package Documentation (IEPDs) can reuse data components from the DDM/DD core, domains can add extensions, and use of existing external domains and standards to accelerate development.
- Information exchanges modelled in using DDM/DD and the systems that implement them are not required to be migrated to each new release of the DDM/DD

7.0 Recommendations and Next Steps

7.1 ABS Recommended Model

The ABS recommends that all three models be taken into Phase 2, to maintain the forward momentum in the development of a national data dictionary for the emergency services sector. As each of the different models are discussed in Phase 2, information will come to light when creating definitions, classifications, and attributes, as to whether each of the terms used are the same, similar, or completely different and whether a special class, subclass or an attribute is required. This agreement will provide a basis for a nationally consistent model for data collection and reporting of PPRR activities for implementation by Australian emergency service organisations in particular the Fire Brigades, the Rural Fire Service and the S/TES (excluding Ambulance and Police)

However if the Steering Committee decide to choose one model to move forward with they will need to make a decision on the following areas: Outcome, Effect, Cause, Event, Response and Definitions of Classes, as these are the areas in the models where agreement between the jurisdictions is required.

Final sign off of Phase 1 of the NDMP Data Dictionary project by the Managing Sponsor, the NSWFB Project Sponsor and Committee Chair.

7.2 How to Arrive at a Single Model in Phase 2

The ABS suggests:

- that the contractor for Phase 2 workshops all agencies and that all ideas are raised at the workshop to come to some agreement on a logical model;
- that all three models are tested with scenarios from across the PPRR spectrum; and
- when agencies see more of the data items and understand more of the attributes there will be less duplication within the model.