



**Australian Government**

**Geoscience Australia**

*Report on the*  
*Stakeholder Engagement Workshop*  
*for the*  
**National Exposure Information System (NEXIS)**

*23 – 24 November 2009*

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Risk and Impact Analysis Group  
Geoscience Australia

# Stakeholder Engagement Workshop of NEXIS

*23 - 24 November 2009*

<b>SUMMARY</b> .....	
<b>BACKGROUND &amp; AIMS</b> .....	
<b>PROGRAM</b> .....	
<b>STAKEHOLDERS</b> .....	
<b>SESSION REPORTING</b> .....	
<b>Risk Analysis and the NEXIS Capability</b> .....	
<b>Emergency Management</b> .....	
<b>Socio-Economic Resilience</b> .....	
<b>Climate Change Adaptation</b> .....	
<b>Built Environment</b> .....	
<b>ISSUES &amp; RECOMMENDATIONS</b> .....	
<b>ANNEX 1 - Workshop Participants</b> .....	
<b>ANNEX 2 - Notes from the Breakout Sessions</b> .....	

## **SUMMARY**

Decision making on community, government and business vulnerability and risk requires a reliable understanding of the nature of the assets at risk. These include people, buildings, economic activity and critical infrastructure. Collectively they are termed “exposure” and Geoscience Australia (GA) has developed a system which now defines a wide range of exposure types in a current and consistent way on a national scale. The capability is called the National Exposure Information System and is now widely known by the acronym NEXIS. This investment was prompted initially by the agency’s own information needs, but more recently development resources have been supplemented with contributions made by other stakeholders to meet their information needs.

So far, Geoscience Australia and its partners have developed NEXIS for applications in risk assessment and risk management by government and industry. Into the future there are significant opportunities to augment the information NEXIS contains to make it more accessible to a broader range of stakeholders. However, all these opportunities cannot be pursued concurrently. For this reason a workshop was convened at Geoscience Australia to seek a better understanding of stakeholder needs and how these will progressively change into the future. The feedback derived from this engagement will feed into a strategic development plan that is compatible with stakeholder needs and the developmental resources that can potentially be realised in the future.

The NEXIS stakeholder engagement workshop was held on 23<sup>rd</sup> and 24<sup>th</sup> November 2009 as part of a broadening stakeholder engagement. The workshop had five sessions which focussed, in turn, on Geoscience Australia’s current capabilities, Emergency Management needs, Socio-Economic Resilience, Climate Change Adaptation and the Built Environment. Each session comprised three lead presentations to stimulate ideas for discussion in the break-out sessions which followed. The outcomes and recommendations from the respective sessions are outlined below.

### **Definition of the NEXIS Capability**

NEXIS is a comprehensive information system that is currently used to underpin impact assessments for a wide range of hazards and threats. The range of impact assessment issues and stakeholder needs discussed over the two days of the workshop made it difficult for many stakeholders to understand precisely the current scope of NEXIS. The capabilities, boundaries and limitations of its usage need to be explicitly explained to stakeholders. Primarily NEXIS is intended to be an aggregation of public domain datasets that excludes any commercial-in-confidence datasets sourced, for example, through the Critical Infrastructure Protection Modelling and Analysis program managed by the Attorney-General’s Department. It does not contain vulnerability models or a mapping capability. However, it can enable exposure data to be linked with vulnerability models and is readily introduced to Geographic Information Systems mapping environments for analysis. NEXIS limitations also need to be highlighted. For instance, for some localities NEXIS utilises aggregated data with rules and assumptions to derive generic information rather than data specific to individual properties.

NEXIS and its capability need to be better understood by stakeholders including those on emergency management, infrastructure management, industry sectors, research and government policy agencies (including local governments). There is a clear need to develop and implement a communication strategy to make the best use of exposure information.

## **Expanded Exposure Base**

NEXIS should become a national entry point for the specific data required for multi hazard risk assessments, including those hazards that may be exacerbated by climate change. It should build on Geoscience Australia strengths which include topographic mapping (Digital Elevation Models), geology, land-use, soils, ecology, and remote-sensed imagery. The settlements and infrastructure attributes important for coastal zone management need to be expanded with better resolution to include, for example, the ground floor height of buildings to assess inundation impacts. Exposure information about primary industries and national parks and ecologically significant elements also need to be integrated with NEXIS in support of socio-economic resilience studies.

## **Engage Data Custodians to Enhance Quality**

Data custodians from various levels of government and other agencies need to be engaged to source more specific data sets to underpin the development of NEXIS. High resolution data on the built environment is often available from local councils. NEXIS must develop a framework whereby it can integrate data from local councils, state jurisdictions and national agencies. It also needs to include agency-specific data from other sources such as FaHCSIA the Murray Darling Basin Authority (MDBA) and industry. NEXIS should be seen as a centralised database at a national scale. State, territory and local governments should be engaged to contribute their own data for the benefit of their respective communities. Strategies should be developed to involve local councils to improve data collection and quality for NEXIS integration to underpin decision making. This may be achieved through sharing the ownership, data and tools developed by NEXIS. Agreements (MOUs) need to be established with users and data providers for data integration, sharing and improvement.

## **Broad Access for Data & Decision Support Tools through a NEXIS Gateway**

NEXIS is a unique information system that can provide information for a broad range of stakeholder needs. It is highly recommended that GA conduct a detailed stakeholder mapping and needs analysis through closer engagement of existing and potential users. Products and decision support tools should subsequently be developed that are suited to the stakeholder requirements.

NEXIS should become the national and accessible entry point for exposure data through the development of an information gateway drawing on GA's spatial data infrastructure strengths. NEXIS can serve as a "one-stop-shop" for nationally consistent exposure information and dissemination. This will entail the development of infrastructure and systems that can support the near real-time data needs of stakeholders.

## **Temporal Exposure Requirements**

To address some stakeholder applications, such as emergency response planning, the additional capability of temporal population exposure needs to be built into NEXIS (that is, location and movement of populations hourly, daily, weekly, annually). This requires the development of spatio-temporal activity models that integrate with NEXIS. The implementation of these models will strengthen population impact analysis and decision-making for rapid onset events such as bushfires, tropical cyclones and terrorist attacks. Future projections of infrastructure and demographic patterns are also important to analyse the impacts of climate change on settlements and infrastructure.

## **Expand Stakeholders Base**

There were many organisations not represented by the workshop attendees that would benefit from exposure information of this resolution. There is a need to identify new or potential stakeholders such as the MDBA and the Department of Health and Ageing. The ability to integrate exposure data with their own analytical needs will greatly benefit these organisations. NEXIS must take the opportunity to be a part of the Commonwealth Spatial Data Infrastructure (CSDI) and exploit CSDI in its linkages.

## **The Path Forward**

The two day workshop provided an invaluable opportunity to derive present and prospective stakeholder/client feedback on the opportunities to advance NEXIS to meet current and emerging exposure information needs. From the informed contributions made by the 40 external attendees issues were discussed across the five themes and recommendations distilled for taking the capability forward. Collectively they point to a significantly broadened capability that is accessible for adaptation strategy development, emergency management, policy development and research. These recommendations will be used by Geoscience Australia to refine a strategic plan to enable NEXIS to meet the needs of Australian decision makers.

## **BACKGROUND & AIMS**

Fundamental to an understanding and management of risk is reliable information about things of value exposed to natural hazards and threats. Exposure includes people, buildings, business activity and critical infrastructure.

Geoscience Australia (GA) has undertaken the development of the National Exposure Information System (NEXIS) which is a significant national capability to provide reliable, consistent and up-to-date information for decision makers.

NEXIS collects, collates, manages and provides the information required for modellers and decision makers to assess community exposure, vulnerability and risk. Presently this capability uses a largely statistical approach to consistently define national residential and business exposure in Australia with information assembled at individual building level resolution. Exposure information is derived from the best available datasets and includes a broad range of useful information fields. Progressively this information is being refined with more specific local information in collaboration with a range of data custodians.

Furthermore, this capability is being extended to include institutional buildings (schools, hospitals, government buildings, emergency assets etc.) and infrastructure assets. Alignment of its future development to the needs of stakeholders is vital.

This NEXIS stakeholder engagement workshop was aimed at:-

- reviewing the current NEXIS capability, the information gaps and utilisation by stakeholders;
- expanding the scope of this national capability to support evidence based decision making;
- broadening the engagement of the whole of government and other data custodians;
- obtaining the perspective of current and potential stakeholders on their current and future information needs and opportunities; and,
- promoting the best use of this information.

## PROGRAM

### Day One 23 November 2009

- 10:10 Arrive – Morning Tea  
10:30 Welcome and Opening Session
- 10:40 **Session 1** – Risk and Impact Analysis Activities  
Presentation 1 - Risk and Impact Analysis Activities – John Schneider  
Presentation 2 - Real-time Warning – Dan Jaksa  
Presentation 3 - NEXIS – Krishna Nadimpalli

*Questions and Discussion (facilitated by Chair)*

12:15 Lunch

- 13:00 **Session 2** – Emergency Management  
Presentation 4 - Coastal Inundation Studies – Elliot Simmons  
Presentation 5 - Relief Response Information – Sue Hunt  
Presentation 6 – Emergency Response – Rick McRae

*Breakout Session and Reporting (60mins)*

15:00 Afternoon Tea

- 15:20 **Session 3** – Socio-Economic Resilience  
Presentation 7 – Local Government Perspective – Penelope-Jane Fry  
Presentation 8 - Community Resilience – Rachel Dempsey  
Presentation 9 – Socio-economic Impact Analysis – Robyn Betts

*Breakout Session and Reporting (60mins)*

17:20 Close for the day

19:00 Dinner

### Day Two 24 November 2009

- 8:40 **Session 4** –CC Adaptation  
Presentation 10 - Policy Drivers – Catherine Farrell  
Presentation 11 - Infrastructure Adaptation – Ron Cox  
Presentation 12 - Jurisdictional Initiatives – Jenny Rigby

*Breakout Session and Reporting (50mins)*

10:30 Morning Tea

- 10:50 **Session 5** – Built Environment  
Presentation 13 - Building Regulation Development – Brian Ashe

Presentation 14 - Bushfire Community Impact – Richard Thornton  
Presentation 15 - Urban System Studies – Austin Ley

*Breakout Session and Reporting (60mins)*

12:30 Lunch

13:15 Summary & Outcomes

14:30 Workshop Close

## STAKEHOLDERS

NEXIS stakeholder base is quite a diverse group of organisations which includes the emergency management and research communities along with policy and planning at all levels of government. The key agencies involved in this stakeholder engagement include

Attorney General's Department  
Department of Climate Change (DCC)  
Department of the Environment, Water, Heritage and the Arts (DEWHA)  
Department of Innovation, Industry, Science and Research (DIISR)  
Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA)  
Department of Infrastructure, Transport, Regional Development and Local Government  
Bureau of Infrastructure, Transport and Regional Economics (BITRE)  
Australian Bureau of Statistics (ABS)  
Bureau of Meteorology (BOM)  
Australian Government Disaster Response Committee (AGDRC)  
Department of Human Services (DHA)  
Murray Darling Basin Authority (MDBA)  
Australian Buildings Codes Board (ABCB)  
Emergency Information Coordination Unit, Department of Lands, NSW  
New South Wales State Emergency Services (SES)  
New South Wales Fire Brigades  
Victorian Department of Sustainability and Environment (DSE)  
Office of the Emergency Services Commissioner, Victorian Department of Justice  
Emergency Management Queensland (EMQ)  
Queensland Department of Community Safety  
Fire and Emergency Services Authority of Western Australia (FESA)  
ACT Emergency Services Authority (ESA)  
Melbourne City Council  
Adelaide City Council  
City of Sydney  
Rockhampton Regional Council  
Risk Frontiers, Macquarie University  
National Climate Change Adaptation Research Facility  
Bushfire Cooperative Research Centre (CRC)  
Insurance Australia Group (IAG)

There are several other stakeholder organisations unable to be represented in the workshop which are interested in NEXIS development. These are listed below and their advice was fed into the workshop discussion:-

CSIRO  
Australian Local Government Association (ALGA)  
Major Cities Unit, Infrastructure Australia  
Australian Reinsurance Pool Corporation  
Munich Re  
AON Benfield  
Sydney Water  
Telstra

## **SESSION REPORTING**

### **1. Risk Analysis and the NEXIS Capability**

Geoscience Australia's Risk and Impact Analysis Group (RIAG) aims to provide data, information, knowledge, expertise and advice in the context of emergency planning, preparation, response and recovery.

RIAG's NEXIS project collects, integrates and provides nationally consistent exposure data to stakeholders for their decision making processes. NEXIS is particularly strong in urban areas with data on residences, businesses, industry and institutions. NEXIS information is stored at individual building level resolution and is available in the public domain at regionally aggregated levels. Future development directions include attributes that support climate change adaptation the spatio-temporal projection of community populations.

Stakeholders raised questions on the spatial variability of data reliability and whether NEXIS should also include evacuation route information and building energy ratings.

GA's Australian Tsunami Warning System (ATWS) is a near-real time system built through agreements and collaborative activities with the Bureau of Meteorology and Emergency Management Australia. It provides information on earthquakes that have the characteristics to potentially damage Australian interests either by ground shaking or through tsunami wave generation. Australia shares tsunami information with India and Indonesia. The use of NEXIS data in a rapid (near-real time) ATWS preliminary impact modelling tool would be of great benefit to emergency managers and decision makers. Another GA hosted system, Sentinel Hotspots, is a public website displaying near-real time wildfire 'hotspots' sensed by satellite. This system has been used heavily by emergency managers and the public during many recent Australian fire events.

### **2. Emergency Management**

Three speakers gave presentations on the topics of (1) tsunami coastal evacuation planning in NSW, (2) Australian Government policy and assistance arrangements for disaster recovery in communities and (3) the 1:25,000 Operational Atlas for emergency response in the ACT.

These presentations raised the potential for NEXIS to link with tsunami evacuation planning, large socio-economic data sets held by FaHCSIA and the ACT Operational Atlas (especially in rural areas).

Subsequent discussions focussed on several issues:

- restrictions on the use of detailed exposure data in the public domain
- the need for timely (near real time), relevant and accurate exposure and impact information in response to disasters
- the need for consistent data standards (e.g. addresses)
- the need to reduce redundancy of data maintenance through effective collaboration
- the use of social media networks (e.g. Twitter) in real time response

Stakeholders discussed their present emergency management exposure information needs, priorities and how NEXIS could meet these priorities:

- the paramount consideration is human vulnerability and safety
- other pressing data issues include the integration of more local (specific) data and the determination of one street address for each property
- quality of rural data is problematic but important
- (near) real time exposure and likely impact data
- new data theme suggestions: primary industry, agriculture, cultural heritage, tourism, biodiversity, environmental assets, hazardous chemicals, economic activity, water bodies and water quality, road flow capacity and population dynamics
- consider the community demand for information and its provision via a web interface
- NEXIS could develop a communication strategy to clearly articulate its purpose
- NEXIS could better identify stakeholders, users, data gaps and sharing opportunities
- NEXIS could consider partnerships, strategic alliances (SLAs, MOUs, etc) with data providers and users
- NEXIS should be timely, current, accurate, relevant, consistent and accessible

### 3. Socio-Economic Resilience

Three speakers gave presentations on the topics of (1) business and community resilience with respect to water demand in the Murray-Darling Basin (2) community resilience from a Local Government perspective and (3) socio-economic impact assessment (SEIA) modelling.

These presentations highlighted the importance of sharing and communicating information, the potential for NEXIS to be a catalyst for behaviour change and the opportunity to incorporate information in support of economic loss modelling into NEXIS.

Subsequent discussions focussed on several issues:

- the need to distinguish between economic and social vulnerability
- the relative importance of information on critical infrastructure versus buildings
- how to persuade 'tree-changers' to accept the reality of their environment
- responsibility at individual and community levels

There is a reasonable basis for extending NEXIS into the area of agriculture, however, this is not without its challenges

- Post event survey activity should gather information on what agricultural activity was being carried out, eg number of sheep, number of cows, area of crop or plantation. These are valued at the market value of the herd/crop to reflect the loss that is incurred
- Agriculture in NEXIS presents a number of problems such as the highly variable and flexible nature of the rural industries. They adapt to market and agronomic circumstances on a yearly basis and where there is multi-cropping the seasonality of the crops will require seasonal layers in the NEXIS.

Activity modeling which identifies where people are likely to be spatially and temporally, should have a 24 hour analysis clock. The analytical capability for such would reside outside of NEXIS. However, NEXIS should be the repository for what might be a starting (or model initialising) population. Information source issues discussed were:

- The CLUES seems to be able to give some of the information however a significant exercise would be required to develop any useful modelling from their datasets. (Southern Cross Station is interested in this being analysed).

The use of the SEIA method to bring together values of tangibles, intangibles and some indirect costs (business losses and disruption losses) was discussed. The following were highlighted:-

- The nomenclature and methodologies applied do not translate directly to those that risk analysis uses in terms of direct and indirect.
- The general method of calculating the value of buildings, for example, is to take 85 % of the new market value. This implies a capital loss of 15% depreciation. By contrast the use of replacement value as is done in many GA studies identifies the cost to rebuild.
- Much of the data gathered under the SEIA model that could provide socio-economic situational awareness includes:
  - population age and gender
  - employment and income
  - business activity and industry breakdown

Stakeholders discussed their present socio-economic resilience information needs, priorities and how NEXIS could meet these priorities:

- the need for socio-economic mapping in NEXIS – identify and profile communities in NEXIS (e.g. industry / employment centres and their catchments)
- NEXIS should examine the Victorian methodology and templates to improve.
- do not reinvent the work of social scientists (e.g. VIPER index)
- important role for Local Government in providing data
- data on community access to resources, health, social, transport, communication
- sensitivity of businesses to loss of key utilities
- loss of employment data from employment centres
- insurance penetration and household wealth
- proximity to resources for rebuilding
- metric of key economic sectors (e.g. agriculture / exports at SLA level)
- event frequency and priorities will shift with population growth and climate change
- NEXIS could assist with the rapid provision of information to communities
- NEXIS could be an integrating agent using other methodologies

#### **4. Climate Change Adaptation**

Three speakers gave presentations on the topics of (1) Australian Government climate change assessment and adaptation initiatives, (2) ongoing research into impacts and adaptation issues for Australian settlements and infrastructure and (3) adaptation planning and data gathering in Victoria.

These presentations put forward the view that NEXIS can become the national entry point (“one stop shop”) for data, mapping and various information related to exposure (including climate change), and the archive for past, present and future information. Expansion of NEXIS data to include structure maintenance costs, smaller infrastructure and population projections would benefit climate change assessments.

Stakeholders discussed their present climate change exposure information needs, priorities and how NEXIS could meet these priorities. The following information needs and priorities were specifically raised:

- floor level data is critical for accurate vulnerability assessment
- high resolution terrain and bathymetry models are also critical; Government should therefore quickly coordinate national LIDAR dataset collection
- asset exposure data should be located in four dimensions (xyz and time) to capture changes over time
- include asset maintenance information and retrofit costs (to meet new standards)
- population and planning trends and building standards should be used to predict the future building stock
- level of data requirement depends on user needs (e.g. individual, Local / State / Federal Government)
- provision of outputs and analysis via a data access interface carries the issues of cost, reliability and liability
- NEXIS could be the tool to bring much current work together
- NEXIS could be proactive in providing data
- NEXIS could be used as an education resource in schools
- NEXIS could incorporate non-Government information sources (e.g. Google and social media)
- NEXIS could influence future data collection methods by projecting data needs forward
- NEXIS could connect Federal and Local Governments based on understanding of shared data usage and benefits
- NEXIS could become the single repository of all emergency data

## 5. Built Environment

Three speakers gave presentations on the topics of (1) future development of the Building Code of Australia using available information, (2) post disaster field survey data collection following Victoria's 2009 bushfires and (3) municipal collection of land use and employment survey data.

These presentations illustrated the central role that NEXIS can play as a consumer, integrator and provider of valuable data. For example, supplying nationally consistent exposure information based on detailed and specific survey data for use in post-disaster impact assessments and development of appropriate building standards. NEXIS information was found to be invaluable during the Victorian fires post-disaster survey

Subsequent discussions focussed on a couple of issues:

- NEXIS should focus on raw data rather than interpretation
- the need for NEXIS to reflect season population dynamics

Stakeholders discussed their present built environment exposure information needs, priorities and how NEXIS could meet these priorities:

- identify primary residents versus holiday homes
- accurate data on building age, floor level and level of fire protection
- hazardous materials storage and processes including storage levels (flooding)
- include international BE metrics
- cooperate, share data and ideas
- share costs of new data collection
- NEXIS could align or link with Victorian CLUE data

- the CLUE framework should be applied elsewhere
- NEXIS could source detailed building data from Local Government

## **ISSUES & RECOMMENDATIONS**

The following were the key issues raised and recommendations derived from the workshop:-

### ***NEXIS is ...***

- a spatial exposure information system that is used for vulnerability and impact analysis for a wide range of hazards: sudden onset (e.g. natural hazards) or long term (e.g. climate change)
- an exposure information system that does not contain vulnerability models
- currently a national buildings database with clear stakeholder interest to extend its function to critical infrastructure, agriculture and environment
- a mapping to physical and economic vulnerability models for impact with clear stakeholder interest to extend vulnerability models to socio-economic and environmental areas.

### ***NEXIS is not ...***

- a self-contained tool to analyse direct and indirect impacts. Rather, it is a source of exposure data that can link other data, models and analysis. Others include geospatial, hazard and vulnerability impact models
- a repository for physical and financial vulnerability models for impacts. (There is clear stakeholder interest to extend vulnerability models to socio-economic and environmental)
- a national spatial database that can link with other (possibly non spatial) databases for storage and retrieval and processing of social and economic data for governments e.g. for health, education, social services, budgets and revenue collection, elections

### ***Priorities for new information and improvements***

- Human life exposure and casualty model attribution
- Socio-economic data for use with vulnerable models (e.g. from ABS, BITRE, Centrelink, VIPER, Education, State/Territory/local)
- Community profiling e.g. for special needs groups, key community economic sectors, proximity to resources, insurance penetration, household wealth
- Access to archives of previous community assets for time series modelling future projections of infrastructure and demographics
- Inclusion of local level, community and individual information
- Inclusion of rural and agricultural exposure to assess vulnerabilities
- Time varying exposure for risk assessment (people, agriculture, intra-daily, weekend, holiday, longer cycles)
- Inclusion of qualitative asset value measures; cultural heritage, biodiversity
- Potential new stakeholders e.g. MDBA, Local Government, Health (heat wave)

### ***How can NEXIS be improved?***

1. Define what NEXIS is
  - a. fit for purpose, who are the stakeholders (contributors, users)
  - b. where does it fit? (PPRR, response vs. planning, climate change mitigation vs. adaptation, community risk reduction)
  - c. what are the boundaries of function?
2. Define stakeholder needs (stakeholder needs analysis)
  - a. what are the linkages (e.g. with state/territory/local/community)?
3. Establish a communication strategy
4. Establish agreements/MOUs with users/contributors for data integration/sharing/improvement
  - a. e.g. States/Territories/Local, ABS,
  - b. build on other data collection initiatives
5. Formalise a data model
  - a. (ref EMIDP), sources, quality, SPOT
6. Address web delivery, decision support tools and related issues

## ANNEX 1 - Workshop Participants

Name	Organisation	Email
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## ANNEX 2 - Notes from the Breakout Sessions

SESSION 2 – Emergency Management		
Present exposure information needs	Information priorities & how these will change	How NEXIS can meet these priorities
<ul style="list-style-type: none"> <li>• Identify current NEXIS data gaps, users</li> <li>• Data sharing</li> <li>• Fine scale (local, specific) data</li> <li>• Future trends</li> <li>• Link to other projects – IDP, NSIM</li> <li>• Primary industry, agriculture</li> <li>• Cultural heritage; Tourism; Biodiversity; Environmental assets; Hazchem</li> <li>• Dams, lakes, water quality</li> <li>• Road flow capacity</li> <li>• Economic activity</li> <li>• Vulnerability – human life risk</li> <li>• Street address for each property</li> <li>• Who is in the community? Where do disabled people live?</li> <li>• Heatwave planning (schools, aged care)</li> <li>• People and community; Social / demographics; Community networks, Health</li> <li>• Activity modeling and safe places</li> <li>• Evacuation planning: routes; dynamic route alteration; account for pedestrians</li> <li>• Footprint areas – Energy; Major services; Infrastructure vulnerability &amp; system recovery</li> </ul>	<ul style="list-style-type: none"> <li>• Specific information</li> <li>• Data integration</li> <li>• Timeliness; Currency; Accuracy; Relevance; Consistency; Accessibility</li> <li>• Data sharing (State, Commonwealth)</li> <li>• Community demand for information</li> <li>• Operations vs Policy stages? (within PPRR)</li> <li>• Risk communication</li> <li>• Plan for specific hazard scenarios</li> <li>• Vulnerability maps of all hazards &amp; hot spots (eg. Hazchem)</li> <li>• Mapping - Where people are; Evacuation routes; Safe places</li> <li>• Vulnerability of people</li> <li>• Human life</li> <li>• Population dynamics</li> <li>• Internal migration</li> <li>• Enable scenario modelling including dam break and pollution</li> <li>• Critical water needs for humans, agri. irrigation</li> <li>• Critical infrastructure; Food supply</li> <li>• Rural data (quality issue)</li> <li>• Changing cultural diversity, land use</li> </ul>	<ul style="list-style-type: none"> <li>• Identify stakeholders/users</li> <li>• Define NEXIS purpose</li> <li>• Define data model, items, sources, quality</li> <li>• Maintain and update data</li> <li>• Integrate more local information</li> <li>• Include qualitative measures</li> <li>• Service level agreements / MOUs with users</li> <li>• Partnerships and strategic alliances with identified external authoritative data sources</li> <li>• Linkages with Local Government</li> <li>• Web interfaces for public access, awareness &amp; education</li> <li>• Real time – automation</li> <li>• Available at person-level (why should populace not see this?)</li> <li>• Define appropriate admin boundaries</li> <li>• Apply exposure at various scales (State, Region, LGA, Community level)</li> </ul>

**SESSION 3 – Socio-Economic Resilience**

<b>Present exposure information needs</b>	<b>Information priorities &amp; how these will change</b>	<b>How NEXIS can meet these priorities</b>
<ul style="list-style-type: none"> <li>• Define user requirements</li> <li>• Define “community” in NEXIS (geographic area)</li> <li>• Education</li> <li>• Census data incorporation</li> <li>• Age distribution/demographics</li> <li>• Identify exposures</li> <li>• Identify (vulnerable) communities</li> <li>• Identify special needs</li> <li>• Community profiling</li> <li>• Employment centres and their community catchments</li> <li>• Insurance penetration &amp; household wealth vs income</li> <li>• Sophistication of leadership, community support</li> <li>• Access to resources, health, social, transport, communication</li> <li>• Sensitivity of businesses to loss of key utilities (water/ electricity)</li> <li>• Impact of loss of employment or infrastructure Income</li> <li>• Identify industry locations that support community</li> <li>• Proximity to resources (labour/ plant/ materials) to rebuild</li> <li>• Metric of key economic sectors (SLA from ABS) eg agriculture, exports</li> <li>• Testing the variable against scale of event &amp; size of community</li> </ul>	<ul style="list-style-type: none"> <li>• Community expectations, legal requirement (expect info quickly)</li> <li>• Climate change – event frequency</li> <li>• Population growth</li> <li>• Experience leads to demand</li> <li>• “Acute” or “Planning for the Acute”</li> <li>• Socio-economic vulnerability (archive) (delivery-access pathway) e.g. “VIPER” (Vulnerability Index for Petrol Expense Rises, Dodson &amp; Sipe, 2007)</li> </ul>	<ul style="list-style-type: none"> <li>• Communications strategy</li> <li>• NEXIS integrating agent using other methodologies</li> </ul>

## SESSION 4 – Climate Change Adaptation

Present exposure information needs	Information priorities & how these will change	How NEXIS can meet these priorities
<ul style="list-style-type: none"> <li>• Need to understand what is happening now – data gaps</li> <li>• Understanding of projected data needs (i.e. 2050, 2070) – collection methods</li> <li>• Demographic socio-economic – current, trends</li> <li>• Critical floor levels, 1:100 event planning</li> <li>• Hi-res terrain &amp; bathymetry models</li> <li>• Code data in 4D (xyzt)</li> <li>• Bio-physical data</li> <li>• Risk maps at planning scale</li> <li>• LGA vulnerability info</li> <li>• LGA population and planning trends</li> <li>• LGA input of datasets – Census (ABS tasking, COAG)</li> <li>• Age profiles</li> <li>• Migrant profiles</li> <li>• Vulnerable community locations</li> <li>• Design &amp; construction guidelines &amp; standards for infrastructure</li> <li>• Access issue – interrogation tool (terms of use - cost, reliability, liability)</li> <li>• Fidelity issue – level of data requirement depends on user needs (LG, SG, Fed, Industry)</li> <li>• Sensitivity assessment – asset age (stds), maintenance info, retrofit costs, quality of base data</li> </ul>	<ul style="list-style-type: none"> <li>• Determined by relevant studies (NCVA)</li> <li>• NEXIS to be proactive in providing data</li> <li>• NEXIS to connect Fed -&gt; LG level</li> <li>• LIDAR data - Fed Govt should do this now, reduce overlap, lack of coordination</li> <li>• Baseline data – age, location, structure</li> <li>• Community trends – future building stock is key to Planning/ Code/ Stds (ABCB)</li> <li>• Liability issues – Insurance, vulnerable areas, recognise CC is real</li> <li>• What is normal (e.g. 1:100 flood level) &amp; (predict) how this will change</li> <li>• Funding – for future needs, research, consistent applicable data collection</li> <li>• Encourage more info/ data usage in all areas/ sectors</li> <li>• Interface for data access – outputs &amp; analysis</li> </ul>	<ul style="list-style-type: none"> <li>• NEXIS could be the tool to bring a lot of current works together</li> <li>• Links with organisations for ongoing climate projections (ABS, FaHCSIA)</li> <li>• Connecting Fed -&gt; LG level</li> <li>• Fed Govt must understand the benefits of LG info re CC</li> <li>• LGs must understand how info is used by Fed Gov't</li> <li>• Incorporate non Govt sources i.e. Google, social media etc</li> <li>• Data/info applied for adaptation into the future</li> <li>• Past picture of where we have come from – demographics, infrastructure, built env.</li> <li>• Release of info to encourage debate and for people to manage own risk</li> <li>• NEXIS in schools</li> </ul>

**SESSION 5 – Built Environment**

<b>Present exposure information needs</b>	<b>Information priorities &amp; how these will change</b>	<b>How NEXIS can meet these priorities</b>
<ul style="list-style-type: none"> <li>• User needs will determine requirements of database</li> <li>• Need all data (core data, wanted data, site specific, event specific)</li> <li>• XYZT data</li> <li>• Accurate floor level data – flood damage</li> <li>• Hazardous storage/processes – flood level</li> <li>• Building age data – design capacity</li> <li>• Level of fire protection</li> <li>• Biophysical</li> <li>• People vs Building</li> <li>• Identify primary residents vs Holiday homes</li> <li>• Population dynamics – occupancy change, who is where when?</li> <li>• Define hazard categories w.r.t. impact on built environment</li> <li>• NEXIS-CLUE alignment or linkage?</li> <li>• CLUE framework to apply elsewhere</li> <li>• Understand liability re vulnerability</li> <li>• Frequency of hazard exposure – impact</li> </ul>	<ul style="list-style-type: none"> <li>• Priorities shaped by next disaster</li> <li>• Data compatibility, common data collection methods</li> <li>• Determine data extents/ fields</li> <li>• Infrastructure risk info – service, function</li> <li>• Social welfare</li> <li>• Business continuity</li> <li>• High density dwelling</li> <li>• Population dynamics – occupancy, freq</li> <li>• Movement of people (hazard area, ignore risk)</li> <li>• How do people react? – Communicate the information</li> <li>• Service/ stakeholder agreements (to share)</li> <li>• Inclusion of International BE metrics</li> </ul>	<ul style="list-style-type: none"> <li>• LGAs supply NEXIS</li> <li>• Include the demographic element</li> <li>• Linking NEXIS-CLUE</li> <li>• Cooperation, sharing ideas</li> <li>• Share costs of collection</li> <li>• Be prepared to give more than you may get</li> </ul>