Achievement Standard 91007

Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s)

GEOGRAPHY

1.1

Externally assessed 4 credits

The assessment of AS 91007 (Geography 1.1) focuses on:

- the natural and cultural characteristics (features) of the environments that make them vulnerable to the extreme natural event(s)
- the natural processes that operate to produce the extreme natural event(s)
- the effects of the extreme natural event(s) on the natural environment
- the effects of an extreme natural event(s) on cultural environments
- how different groups of people have responded to the effects of the extreme natural event(s).

Demonstrating geographic understanding of environments and an extreme natural event(s) from around the world will meet the requirements of AS 91007 (Geography 1.1).

- **Geographic understanding** refers to an understanding of how natural environments and people interact and the consequences of that interaction.
- **Environments** refer to either different places that are affected by one type of extreme natural event or different places that are affected by a single extreme natural event.
- **Extreme natural event(s)** refers to one type of naturally occurring hazard that has a major impact on people's lives, such as earthquakes, floods, tsunami, landslides, tropical cyclones.

Achievement criteria

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate **in-depth** geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate **comprehensive** geographic understanding of environments that have been shaped by extreme natural event(s).

'*Demonstrate* geographic understanding of environments that have been shaped by extreme natural event(s)' involves:

- describing aspects of how extreme natural event(s) shape environments
- including **supporting evidence**.

Supporting evidence refers to specific, relevant information from different environments.

'Demonstrate **in-depth** geographic understanding of environments that have been shaped by extreme natural event(s)' involves:

- explaining aspects of how extreme natural event(s) shape natural and cultural environments
- including detailed supporting evidence.

'Demonstrate **comprehensive** geographic understanding of environments that have been shaped by extreme natural event(s)' involves:

- fully explaining aspects of how extreme natural event(s) shape natural and cultural environments using geographic terminology and concepts, and showing insight

- **integrating** detailed supporting evidence.

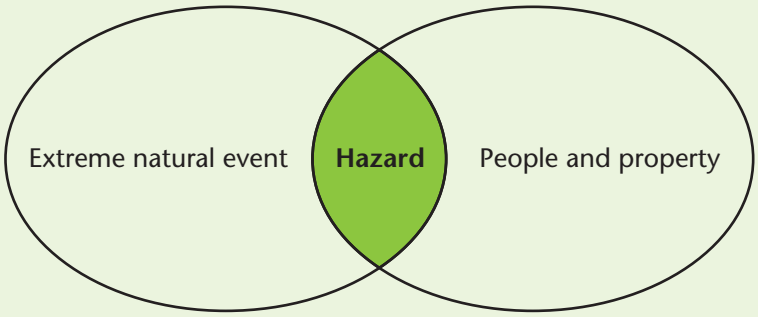
Integrating refers to relevant examples being woven throughout the evidence to support explanations.

Understanding extreme natural events

An **extreme natural event** is a natural event which, because of its size (**magnitude**) and/or **duration** (length of time), becomes extreme, such as:

- avalanches
- droughts
- floods
- tropical cyclones (also known as hurricanes)
- volcanic eruptions.
- coastal erosion
- earthquakes
- landslides
- tsunami

When extreme natural events have the **potential** to damage people or property, they become a **natural hazard**:



Large-scale loss of life and/or property caused by an extreme natural event is a '**disaster**'.

Extreme natural events originate above, on or below the surface of the Earth.

- Above (**atmospheric events**) include tropical cyclones and drought.
- On (**surface events**) include floods or landslides.
- Below (**tectonic events**) include earthquakes and volcanic eruptions.

Case studies, named examples, specific supporting evidence and data must be used with all your written responses. If you look at the *Achievement criteria* for Achievement, Merit and Excellence for AS 91007 (Geography 1.1), you will see **including supporting evidence** is an expectation. Make sure that your study notes have the date (day, month and year), city and country of your case study, e.g.:

Mt Tarawera in Rotorua, New Zealand erupted at 2 am on the 10th June 1886.

Record names of people, organisations, how many people were injured or killed, how and where they were killed/injured, and names of buildings/areas that were damaged, e.g.:

>100 people from Te Wairoa and other Maori villages around Lake Taupo were killed by the Mt Tarawera Eruption in 1886.

The names of countries, leaders and organisations that provided relief support and the specific items, personnel and quantities they provided must also be stated, e.g.:

Prime Minister Naoto Kan of Japan sent a rescue team of 70 rescue workers, doctors, nurses and sniffer dogs to help with the 2011 Christchurch earthquake recovery work.

You can use any extreme natural event around the world. However, it is important to ensure that the case study you use has sufficient specific information and named examples relevant to most of of the focusing questions that could be assessed in the 91007 exam.

Questions: Geographic understanding of environments shaped by extreme natural events

2012 questions

In the box below, name ONE type of extreme natural event, and a case study (studies) that you will use to answer Questions One, Two, and Three.

Type of extreme natural event:

Name of case study (studies):

Question One: Characteristics of the environment

Year 2012 Ans. p. 77

Read the following **Geographic Concepts**. Include specific references to them, as well as to the **extreme natural event** and to the **environment** of the case study (studies) you have named above, to support your answers to this question.

Geographic Concepts

Processes are sequences of related actions that shape and change environments.

Environments may be natural. They have particular characteristics and features, which can be the result of natural processes.

a. Draw a fully annotated (labelled) diagram(s) in the box following, to show the **natural** AND **cultural characteristics** that make the environment of your case study (studies) vulnerable to your named extreme natural event.

Achievement Standard 91008

Demonstrate geographic understanding of population concepts

GEOGRAPHY

1.2

Externally assessed 4 credits

The assessment of AS 91008 (Geography 1.2) focuses on some or all of the following population concepts:

- population distribution – how and why population is spread across the landscape
- population diversity – composition of the population, including ethnicity, age, sex
- migration and mobility of a population, including both external and internal migration trends
- population change over time, including population totals, age-sex structure, natural increase
- population sustainability – capacity of the environment to support a population in the longer term.

Achievement criteria

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate geographic understanding of population concepts.	Demonstrate **in-depth** geographic understanding of population concepts.	Demonstrate **comprehensive** geographic understanding of population concepts.

'Geographic understanding' refers to an understanding of the spatial dimension of population concepts using evidence from different countries and/or regions.

'Population' refers to the people who live in a particular country and/or region.

Patterns, population processes and issues

Population distribution

Population distribution is the geographic 'spread' of people in a country, and is measured by:

Population density = Total population divided by total land area

Population distribution has to do with where people are located and living (settlements), e.g. along the coastline, in urban areas, along major rivers, etc. The location of people (settlements) across a region or a country will create a spatial pattern and/or temporal pattern.

- Spatial patterns refer to how features are arranged, distributed and located in relation to each other and/or other features. Spatial patterns are distinctive and repetitive arrangements of features/objects.
- Temporal patterns are trends and repetitive changes over a period of time.

Some areas will have a concentration (high number) of people and other areas will be sparsely (low number of people) populated.

In order for you to gain 'Excellence', it is strongly recommended that you use geographic terms like *dispersed, random, concentrated, linear pattern* and *clustered* in your identification and explanation of the population patterns.

In the case of temporal patterns, it is recommended to identify and explain trends, i.e. *increases*, *decreases*, *stable*, etc.

In the case of both spatial and temporal distribution/patterns, there will be reasons and factors that have contributed to the identified patterns or why people are located where they are located. These factors can be divided into **natural factors** and **cultural factors**.

Natural factors:

- relief influences population distribution – people settle in favourable living areas with good water, climate and soil fertility
- lowland areas (coastal plains and river valleys) with moderate rainfall and fertile soils – can sustain intensive farming, and have high population densities of between 200 to 2 000 people per km^2 (e.g. the Canterbury Plains near Christchurch on the South Island of New Zealand)
- sparsely populated areas (like mountains, forested areas, jungles or deserts) – have low population densities of less than one person per km^2 because of harsh climates, steep slopes, and poor soil fertility (e.g. the Southern Alps region on the South Island of New Zealand has steep mountains which are often covered in snow)
- natural disasters (like flooding in the Bay of Plenty, tsunami in Japan and the earthquakes in Christchurch) could discourage people from settling in areas/regions that are affected.

Cultural factors:

- availability of resources – can limit population growth or location
- urbanisation – in Japan, 77% of the population live in cities; over 40% of Japan's population live within a 50-km radius of Tokyo, Osaka and Nagoya
- **conflicts** have affected population distribution – refugees fleeing to other countries change the population densities of both places.
- governments affect population distribution with resettlement programmes
- transport links affect accessibility and therefore population growth and location
- availability of infrastructure and services (e.g. hospitals) influence where people settle.

Population distribution in New Zealand

New Zealand's *average* population density is 11 people per km^2, but the *actual* distribution is unevenly spread. Over 75% of us live in the North Island, more than one-third live north of Taupo, and 85% are urban. This distribution pattern is because of:

- natural factors – e.g. relief, climate, soils, minerals and extreme natural disasters
- economic factors – e.g. trade, accessibility of ports and employment opportunities
- cultural factors – e.g. lifestyle factors (environment, beaches, infrastructure and services, family ties and friends).

Questions
Patterns, population processes and issues

2012 Questions

Question One: Global population and sustainability

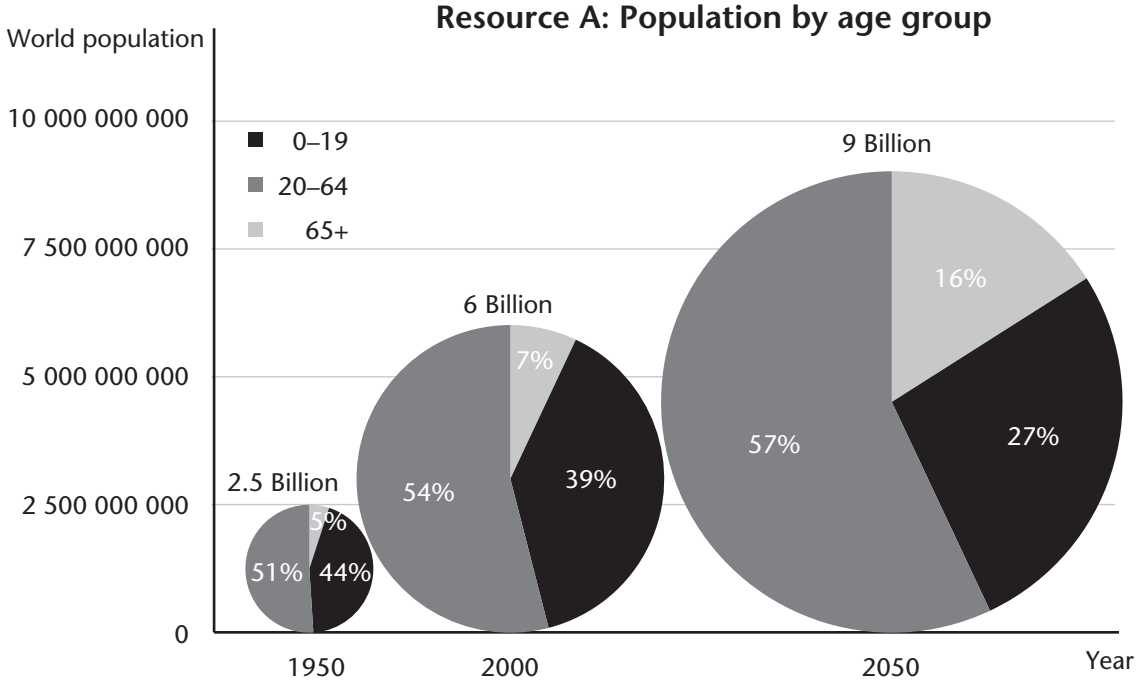
Year 2012 Ans. p. 88

Read the following **Geographic Concept** and refer to it, as well as to **Resource A** following, when answering **a.**

Geographic Concept

Sustainability involves adopting ways of thinking and behaving that allow individuals, groups, and societies to meet their needs and aspirations without preventing future generations from meeting theirs. This includes 'Population Sustainability', which is the capacity of an environment to support a population in the longer term.

Resource A: Population by age group



a. In the hundred years between 1950 and 2050, the world's population will increase by 6.5 billion.

Fully explain how this will impact on (affect) future generations.

Include specific evidence from a **selected case study** (studies) to support your answer.

Questions
Patterns, population processes and issues

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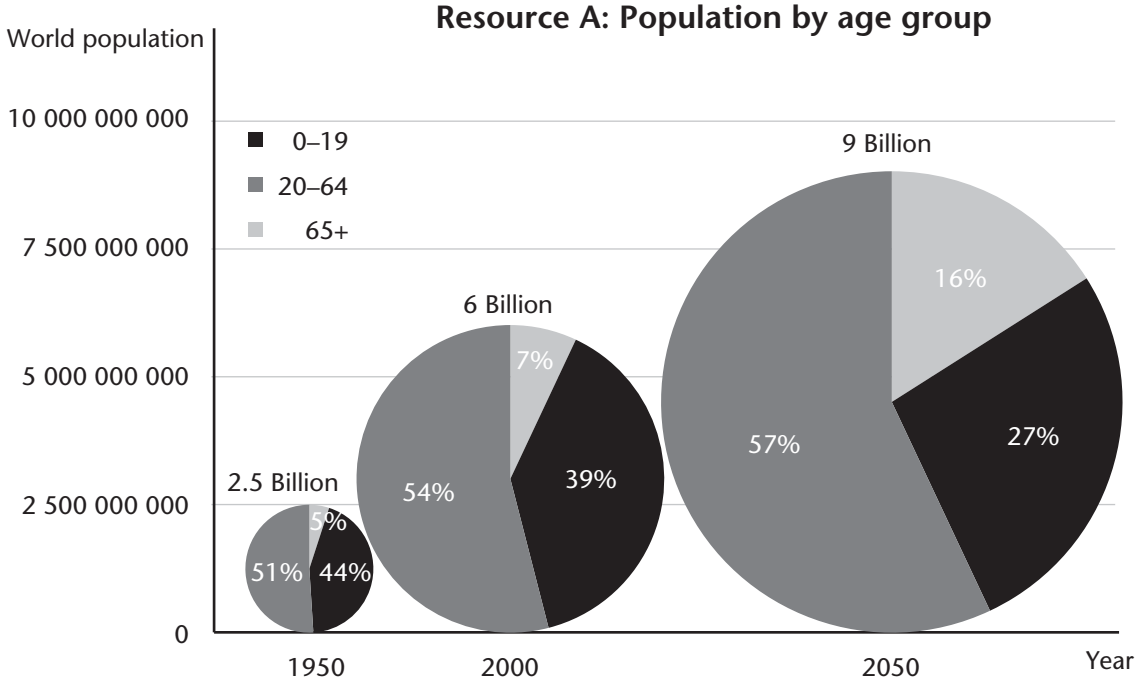


a. In the hundred years between 1950 and 2050, the world's population will increase by 6.5 billion.

Fully explain how this will impact on (affect) future generations.

Include specific evidence from a **selected case study** (studies) to support your answer.

Viewpoints can be classified as environmental, social, economic, or political.

b. Complete the table below for EACH viewpoint:

- select and name ONE person from **Resource J** on pages 113 whose comments reflect that viewpoint
- write for OR **against** to identify their viewpoint on the issue of the park development
- fully explain the reason(s) why EACH person you have selected is either **for** or **against** the park development.

Include specific information from Resource J, and the Geographic Concepts at the start of **3.**, to support your answers. Refer **once** only to a person and their viewpoint.

Note: The first one has been done for you.

ENVIRONMENTAL		
NAME	FOR / AGAINST	REASON(S)
Aaron	*For*	*Aaron sees green spaces as essential to improve the environment and add oxygen to the urban landscape.*
SOCIAL		
NAME	FOR / AGAINST	REASON(S)
ECONOMIC		
NAME	FOR / AGAINST	REASON(S)
POLITICAL		
NAME	FOR / AGAINST	REASON(S)

Answers and explanations

Achievement Standard 91007 (Geography 1.1): Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s)

1.1. 2012 Questions

Type of extreme natural event:
Hurricane Katrina
Name of case study (studies):
New Orleans, south-eastern coastline, United State of America
23–30 August 2005

Question One: Characteristics of the environment

p. 11

a. When answering this question, you are required to identify major natural and cultural features/characteristics that make the environment of your case study vulnerable to your selected extreme natural event.

In the answer that follows:

- the case study is *New Orleans*
- the environment is *the south-eastern coastline of the United States*
- the extreme natural event is *hurricanes*.

The focus of this question *is not on the operation of the extreme natural event process* (i.e. *not on the operation of hurricane processes*), but rather on the specific natural and cultural features of the environment (i.e. New Orleans) which made the environment so vulnerable to the extreme natural event (i.e. the devastating impacts of Hurricane Katrina).

Ensure your diagram illustrates both natural and cultural characteristics. Natural characteristics increasing vulnerability may include: location in a low-lying region of alluvial plains, swamps, lagoons and sand dunes bordered by lakes, sea and rivers, proximity to the equator and high water temperatures (26.5 °C).

Cultural characteristics increasing vulnerability may include: location in a bowl-shaped depression; man-made canals and levees; high population density, high proportion of poor people, heavily built-up area; hotels, casinos and tourist attractions.

Title: **Annotated diagrams showing the natural and cultural characteristics of New Orleans environment that makes it vulnerable to hurricanes like the 2005 Hurricane Katrina**

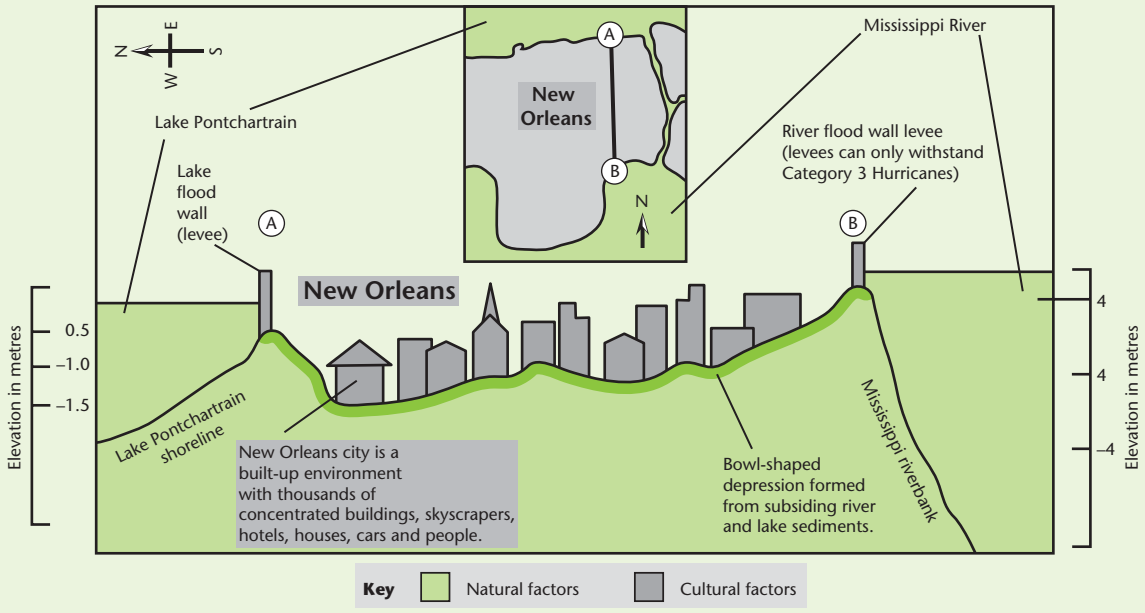


Diagram 1: Cross-section of New Orleans showing the shape and location of the city

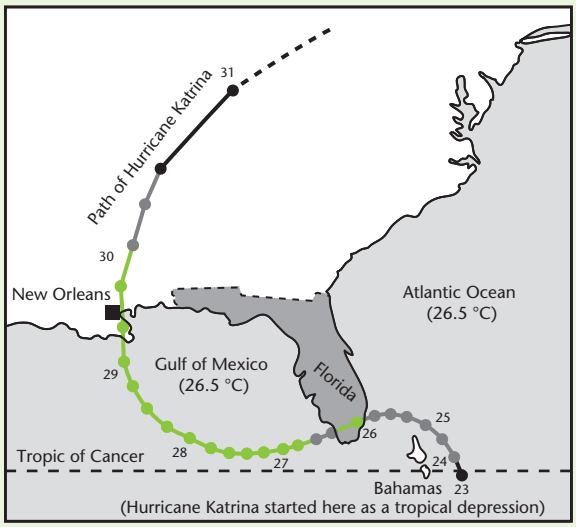


Diagram 2: Location of New Orleans

Earthquakes or volcanism as extreme natural events

If you chose to answer using *earthquakes* as extreme natural events, you need to identify and describe the features and characteristics in your case study environment that relate to its vulnerability to earthquakes – tectonic plate movement, convection currents, faulting, proximity to plate boundaries, population density, urbanisation, soil/rock type, building codes.

If you chose to answer using *volcanoes* as extreme natural events, you need to identify and describe the features and characteristics in your case study environment that relate to its vulnerability to volcanoes – tectonic plate movement, subduction, magma flowing to the surface, closeness to plate boundaries, population density, level of development, warning systems.

(**A**, **M** and **E** – must provide supporting evidence and named examples (e.g. New Orleans, Mississippi River, Tropic of Cancer); **E** – diagram must have detailed labels, a full explanation of how natural *and* cultural characteristics make the named environment vulnerable to extreme natural events (e.g. hurricanes) and clear links to the selected extreme natural event and case study)

b.

a. and b. are related to the same case study environment and extreme natural event. For b., you are required to fully explain the natural *and* cultural characteristics and features that make your case study (studies) vulnerable to your named extreme natural event. It is important that your written answers follow on from the information provided in your diagram add additional detail. Refer to your diagram in your written explanation, e.g. *New Orleans is vulnerable to hurricanes as it is located in the tropics and near the warm waters of the Gulf of Mexico, see Diagram 2*. Reference to a geographic concept is required for 'Excellence'.

Words **coloured and in bold** show examples of supporting case study named examples and evidence. Geographic concepts are in *italics*.

The south-eastern coastlands of America, including Mississippi and **New Orleans**, are vulnerable to the effects of hurricanes like the **2005 Hurricane Katrina** as they are *located* in the **tropics**, a known hurricane zone. This south-eastern coastlands *region* is susceptible to hurricanes because it is positioned above the **Tropic of Cancer** – this *location* has high sea water temperatures **(26.5 °C)** as it is close to the **equator**. Jet streams of high-speed, high-altitude air also circle the Earth at this latitude (10°–30°). The city of New Orleans (see Diagram 2) is close to two large bodies of warm water – the **Atlantic Ocean** and the **Gulf of Mexico**. When the Sun heats the ocean and moisture rises, a **low pressure zone** forms – these factors, combined with strong winds in the tropics, can lead to a hurricane.

The south-eastern coastlines are **low-lying regions** of alluvial plains, swamps, lagoons and sand dunes bordered by lakes, sea and rivers. **New Orleans** was particularly **vulnerable** to the effects of **Category 5** Hurricane Katrina as New Orleans is *located* in a bowl-shaped depression below sea level (and below the level of the **Mississippi River** and **Lake Pontchartrain**) – see Diagram 1. This makes the environment very vulnerable to **flooding** (when Katrina hit, the bowl-shape became flooded in **3.7 m** of water and it took **43 days** to pump the water out).

Natural river erosion and deposition processes in New Orleans have been modified by humans who have built **levees** (raised banks on the edge of rivers and lakes) to control the rivers and stop flooding during storm or heavy flow conditions. The levees in New Orleans could only cope with a Category 3 storm and Katrina was Category 5. These man-made levees have stopped new sediment replacing existing sediment so the wetlands are drying out, shrinking and allowing the coastline to migrate inland.

As New Orleans is a major city, the area has a high population density and is heavily built up. It has a large number of buildings, roads, hotels, casinos and infrastructure, such as the **Louis Armstrong Airport** and the **Biloxi Casino**. The area also earns a large percentage of its income from hosting **blues and jazz festivals**. These cultural characteristics make the environment very vulnerable to the effects of a hurricane due to the high economic costs and potential loss of life.

The location, shape and level of development in New Orleans all contribute to its vulnerability to events like Hurricane Katrina in 2005.

Question Two: Impacts on the natural environment

p. 14

With this question, you are required to fully explain the effects of the extreme natural event you have studied on the natural environment of your case study (presented in the box before the start of Question One). It is also useful to categorise the effects based on which feature of the environment they affect. The features of the natural environment include: **natural vegetation**, **landforms**, **soils**, **waterways** (streams/rivers), **slope** and **coastlines**. Depending on your case study, you may also want to classify the effects as being **positive** or **negative**. Generally, the natural changes caused by an extreme natural event are negative, but positive impacts such as the creation of new land may occur.

The **natural environment** refers to all the physical features formed by the work of nature – includes oceans and land masses, polar ice caps and tropical rainforests, rocks and natural soils, climate, mountains and plains, natural lakes and rivers and biological features like plants and animals.

The geographic concept presented with this question is *change*. To gain 'Excellence', you are required to incorporate this concept into your answer. Detailed supporting evidence, such as named features and clear links between the stated effects and your named environment, must be integrated into your answer.

You must provide a diagram(s). To gain 'Excellence,' your diagram(s) must clearly illustrate a *range* of changes (effects) that your extreme natural event has had on the natural

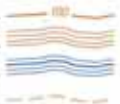
Key

MISCELLANEOUS

Residential area
Large buildings
Isolated building
Homestead, stockyard
Glasshouse or greenhouse
Church, cemetery, grave
Training track
Golf course, helipad
Historic Māori pa, redoubt, monument, plaque or signpost
Reservoir covered, reservoir uncovered, tank
Mast, tower, wind machine or wind turbine
Shipwreck, lighthouse, beacon
Fence (selection only)
Pipeline above ground
Pipeline underground
Disused water race
Power line on pylons (actual positions)
Power line on poles (away from roads)
Telephone line (away from roads)
Industrial cableway
Mine; underground, opencast
Buried gas pipeline

RELIEF FEATURES

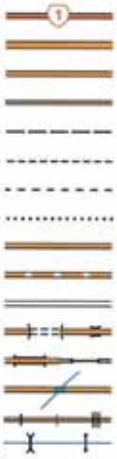
Index contour
Intermediate contours
Perennial snow and ice contours
Supplementary contour
Depression contours
Shallow depression, small depression or shaft
Beaconed trig station (with trig identification code)
Elevation in metres
Cliff, terrace, slip
Rock outcrops
Stopbank, cutting
Embankment or causeway
Saddle, cave
Alpine features
- Moraine
- Moraine wall
- Scree



ROADS AND TRACKS

State highway
Four lanes or more
Two lanes (includes passing lanes)
Narrow road
Vehicle track
Foot track
Closed track (see warning note below)
Poled route
Road surface
- sealed
- metalled
- unmetalled

Tunnel, tunnel under road
Bridge; two lane, one lane
Ford
Gate, locked gate, cattlestop
Footbridge, cableway or handwire



VEGETATION FEATURES

Native forest
Exotic coniferous forest
Exotic non-coniferous forest
Scrub
Scattered scrub
Shelter belt
Trees
Orchard or vineyard
Mangroves

2011 Resource D: Twizel from the air

Iron Bridge

Satellite Image