

A social and environmental impact assessment that examines the impacts that have resulted from the construction and operation of the Channel Tunnel

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Abstract

This thesis examines the social and environmental impacts that have resulted from the construction and operation of the Channel Tunnel. Nord-Pas de Calais, Kent, France, Britain and Europe were all affected through the establishment of the Channel Tunnel. Three sections make up the body of this thesis:

- i. context and theory
- ii. social, environmental and economic impacts associated with the construction and operation of the tunnel
- iii. acknowledgement of the impacts that this development has had on the European Union.

This study draws from an extensive body of literature in identifying and examining the issues that preceded and followed this development. The social and environmental impacts associated with public opposition, environmental impacts, land possession, soil disposal, environmental disturbance, water pollution, noise disturbance, energy consumption, water contamination, fire safety and asylum seekers remain the principal discussion points identifiable throughout this piece. These issues are largely concentrated on the areas of Nord-Pas de Calais and Kent, although they are infiltrating the wider European Union in a number of ways. The social and environmental impact assessments conducted prior to the construction of the of the Channel Tunnel proved to be tools that helped ensure that the bodies driving the development were made accountable for the impacts that arose. These processes also facilitated public involvement through public consultation in the development of social and environmental impact assessment. Early identification and recognition of the social and environmental issues identified by these reports led to a more comprehensive approach to project design, construction and operation.

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This is my analysis and interpretation of the issues and impacts of something I perceive to be an enormous achievement and wonder of the modern world.

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1.0 Introduction

This thesis is a social and environmental impact assessment (S&EIA) that examines the construction and operational issues that arose as a result of the development of the Channel Tunnel¹. This development has had, and continues to have, a direct impact on the environment, society and economy of Nord-Pas de Calais and Kent. Environmental restoration, noise, pollution, asylum seekers, security threats, safety issues and visual impacts are the main issues that arose from this venture. This thesis examines these issues illustrating how they affected individuals living in close proximity to the Channel Tunnel entranceways. While these impacts were concentrated on the areas of Nord-Pas de Calais and Kent, they did infiltrate into other areas of France, Britain and wider Europe. In light of this, the final sections of this thesis examine the wider impacts of this development.

1.1 The Channel Tunnel

The signing of the Channel Tunnel Act 1987 and the Treaty of Canterbury 1986 signaled the beginning of, what would become in the years that followed, a wonder of the modern world. The awarding of the mandate to construct and operate the Channel Tunnel triggered the largest bi-national venture of the twentieth century. This event resulted in an unprecedented level of cooperation between the British and French in the years that followed. It has been recorded that this development came at an overall cost of £6bn (Grayson, 1990, 29). The Channel Tunnel opened for business in 1994 and since that time it has proved itself to be an important piece of transportation infrastructure.

Eurotunnel is a bi-national company of Anglo-French descent. This consortium has the mandate to operate and manage the Channel Tunnel until December 2054 (Eurotunnel, 2003, 5). As a transport entity, Eurotunnel owns and operates nine car and coach shuttles along with 16 truck shuttles (Eurotunnel, 2003, 5). Under the management umbrella, Eurotunnel “ensures the safe, efficient passage of trains belonging to various rail operators: passenger trains (Eurostar) and goods trains” (Eurotunnel, 2003, 5). In 2003, the Channel Tunnel transported on average 350 trains a day (Eurotunnel, 2003, 5). These 350 trains were occupied by some 45,000 people, 6,300 cars and 3,500 trucks (Eurotunnel, 2003, 5).

The Channel Tunnel holds a different meaning to us all. While some see it as merely an effective means of transportation, others hold more insight into the actual extent and significance of this project. Whatever one's viewpoint it is indisputable that the Channel Tunnel has posed a number of challenges and raised an assortment of issues during both construction and since operations commenced in 1994.

¹ The Channel Tunnel is the name of the development that was chosen to physically bridge the English Channel. This development is also commonly referred to as the ‘Chunnel’.

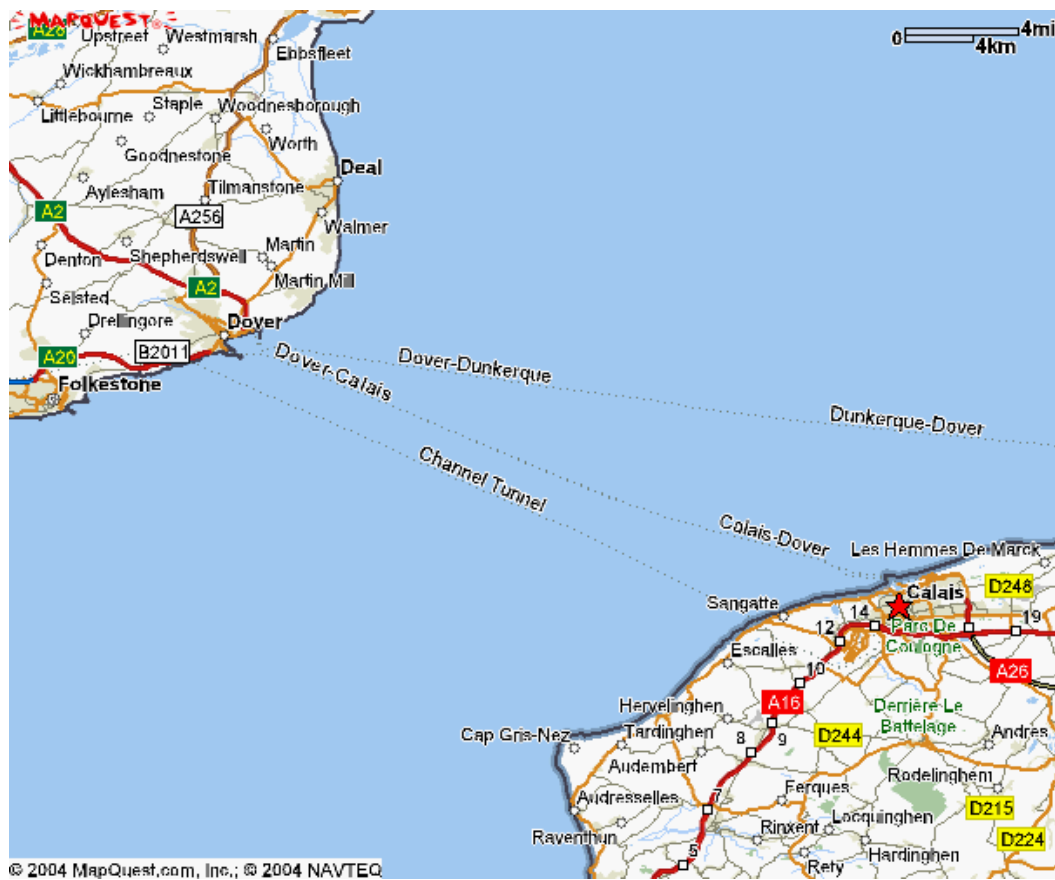
The Channel Tunnel has transcended political, logistical, financial, legal and environmental boundaries. The importance of this venture is illustrated by the number of academics, professionals and government organisations that have taken the time to investigate, analyse and critique this development from a variety of perspectives. These pieces all make for interesting reading whether one is interested from an academic perspective or not. The assortment of articles available on this topic discuss the legislative, financial, political, social, environmental, engineering and biological issues faced during the construction and current operation of this development. Consultation of these reports allows assumptions to be drawn about the impacts that the Channel Tunnel had on the social and environmental spheres of Nord-Pas de Calais, Kent, France, Britain and Europe.

1.2 English Channel passageway

The English Channel is part of the Atlantic Ocean that separates Britain from Northern France (Dictionaries, 1). In French, the English Channel is formally known as *La Manche* (the sleeve). The Channel Tunnel is 560 km long and at its widest it is 240 km (Dictionaries, 1). The two principal groups of islands located on the English Channel are the Isle of Wright and the Channel Islands.

The shortest distance across the English Channel is a 34 km wide span from Dover to Cape Gris-Nez (Dictionaries, 1). Part of this stretch of ocean is known as the Strait of Dover which connects the English Channel with the North Sea. The strait is one of the busiest seaways in the world connecting the four major ports of Dover, Folkestone, Calais and Boulogne. This can be a treacherous, unpredictable piece of ocean that has seen a great deal of tragedy. Weather permitting, from Cap Gris on the north coast of France you can gaze across the English Channel to the Chalk cliffs that form on the Kent coast. This crossing takes about ninety minutes by ferryboat, 40 minutes in a hovercraft or one can swim it in around twelve hours (Newman, 1994, 37).

Figure 1.2.1 The Channel Tunnel



Sourced from (Mapquest, 2004, 1).

This map provides a geographical representation of the relevant part of the English Channel. The route that the Channel Tunnel takes is shown as is the relative locations of Sangatte and Folkestone (Mapquest, 2004, 1).

1.3 The aims and purpose of this research

This thesis is a Social and Environmental Impact Assessment² that examines the constructional and operational impacts that occurred as a result of the development of the Channel Tunnel. Environmental assessment is a discipline in which the environmental effects of a project [are] collated, both by the developer and from other sources, and taken into account by the planning authority in forming their own judgment on whether the development should go ahead (Goodenough & Page, 1994, 33). Impact Assessments are currently used as tools to help reduce and mitigate the concerns that various environmental groups, local government organisations and the general public may have about a particular development.

² Social and Environmental Impact Assessment (S&EIA) is a term used to refer to the process of examining the potential impacts on the daily lives of individuals and communities by assessing the consequences that a project or policy decisions may bring (Burdge & Vanclay, 1995, 1). While environmental impact assessments (EIA) characteristically address social impacts, social impact assessments (SIA) do not necessarily recognise environmental impacts.

Social and environmental awareness grew over the last half of the nineteenth century. This fueled the desire to understand and effectively manage the impacts that came as a result of particular developments. Large scale developments are of particular interest to social researchers because of the magnitude of impacts that are commonly associated with them. The Channel Tunnel is one example of a large scale venture that brought forward a conglomeration of important issues. To understand this development a number of questions are considered, discussed and examined throughout the following thesis. The questions central to this work are:

- A) What is the Channel Tunnel? Where is it? Why is it important?
- B) What were the impacts that arose from the construction and operation of the Channel Tunnel?
- C) How did the impacts identified, affect people living in Nord-Pas de Calais and Kent? How were these impacts mitigated?
- D) Did these impacts extend into other areas of France, Britain and the European Union (EU)? If so, how did these impacts affect people within these areas?
- E) What methods did Eurotunnel employ to manage and mitigate the issues that came about as a result of the construction and operation of the Channel Tunnel?

The aim of this thesis was to thoroughly investigate and answer this set of questions in relation to the development of the Channel Tunnel.

This thesis is of benefit for two dominant reasons. Firstly, this study is a useful reference source for developers who are looking to initiate large scale transportation developments. It is of particular use because the issues that arose as a result of this development will occur with virtually any large transportation venture. In being a source of reference this study fills a need as it gives developers an overview of issues that may occur and gives insights into how these issues may be effectively managed and mitigated. Secondly, this thesis provides some suggestions on how to address the ongoing issues associated with this development. The analysis and recommendations provided pose interesting discussion points that are of use to the bodies responsible for preventing and mitigating the issues at hand.

“The evolution of the SIA discipline has promoted the predictive or ‘*ex-ante*’ model of assessment” (Sampson *et al.*, 2006, 4). This has lead to *ex-ante* assessment practice being emphasised and applied over *ex-post* models (Baines *et al.*, 2003, 23). There are, however, important benefits of *ex-post* impact assessment studies. This is because *post-ante* impact assessment identifies actual effects, in contrast to *ex-ante* studies which only access the projected effects associated with a particular development. In addition, temporal location of *ex-post* assessment allows for the consideration of broader change processes along with the identification of specific impacts (Sampson *et al.*, 2006, 3). The longer the time frame, the easier it is to identify broader change processes. In light of this, the breadth and integrity provided

by *ex-post* assessment is that it can be used to inform more robust *ex-ante* conceptual frameworks.

This thesis explores the impact that the Channel Tunnel has had on Nord-Pas de Calais and Kent, however, there are parts of this thesis that focus on the impact that this venture had within Britain. Furthermore, while notes are provided on the governmental institutions and the legislative frameworks within France and Britain, parts of the following analysis focuses on these aspects from a British perspective. This thesis has taken this format as a result of time and literature constraints as recognised in the concluding chapter of this thesis.

1.4 Thesis format

Ten chapters make up the body of this thesis. **Chapter Two** provides an historical overview of where the idea of physically connecting Europe and the UK originated. In doing this, the early attempts to bridge the English Channel and the reasons behind the abandonment of these earlier attempts are discussed. An accompaniment to this explanation is provided. It demonstrates how the context of the 1980s allowed for this initiative to be made a reality. This chapter illustrates how the political context of this time period allowed for the development to proceed.

Legal aspects are discussed in **Chapter Three**. The legislative background governing this development is identified and the relationships between issues and the legislative background are explored. Environmental impact assessment (EIA) played an important role in the development of the legislation. The role that EIA played in this process and how the contents of these reports were recognised is well demonstrated. The construction and purpose of the Channel Tunnel Act (CTA) and the role and function of public contestation are the focal points of this chapter. In addition to the CTA, the role and function of the Treaty of Canterbury is outlined.

The social, geographical, political and environmental contexts of Kent and Nord-Pas de Calais are acknowledged in **Chapter Four**. Part of this explanation examines how the contexts of these two areas facilitated or hindered the development of the Channel Tunnel. Particular attention is paid to the governmental structures that governed this development in France and Britain. EIA played a central role in the project development. The role of EIA and the theoretical framework of these reports are examined. This explanation justifies the methods and format taken by this thesis. In addition, examination of these reports allows us to trace how the issues associated with the Channel Tunnel were identified, mitigated and managed.

Chapter Five explains why the decision to bridge the English Channel was made and how this decision was formed. The project tenders submitted by Channel Expressway, Channel Tunnel Group- Franche-Manche, Eurobridge and Euroroute are all discussed in this chapter. In addition, the reasons why the Channel Tunnel Group- Franche-Manche was awarded the mandate to design, construct and operate the Channel Tunnel are examined. Design and construction components of this proposal are documented and notes are provided that show the political, economic, environmental and construction issues that were projected to come as a result of this proposal.

The issues that arose because of the construction of the Channel Tunnel are presented in **Chapter Six**. This chapter focuses on how these impacts affected the social contexts of Nord-Pas de Calais and Kent. The issues examined throughout this piece include, public opposition, environmental impacts, land possession, soil disposal and noise pollution. As part of this examination information is provided that illustrates how these impacts affected the lives of those living in close proximity to the Channel Tunnel.

Chapter Seven explores the impacts that have arisen since the Channel Tunnel opened for operation in 1994. Public opposition, environmental disturbance, water pollution, noise disturbance, energy consumption, water contamination, fire safety and asylum seekers are the main discussion points of this chapter. The methods employed to manage and mitigate these impacts and the impact that these issues have had on the social and environmental contexts of the regions neighboring the two Channel Tunnel entranceways are examined in relation to the issues identified.

The economic implications that have arisen as a result of the Channel Tunnel are discussed in **Chapter Eight**. Market considerations, employment, employment statistics, tourism, investment, the demand and supply of transportation facilities, regional development and the wider economic implications for neighbouring regions make up the body of this chapter. These economic impacts are discussed and analysis is provided relating to how these impacts affected society. This chapter draws a distinction between the projected economic impacts and the actual impacts that arose as a result of this development.

Chapter Nine examines the impact that the Channel Tunnel has had on the European Union (EU). This section takes some of the issues identified in chapter seven bringing them into a broader context. As part of this analysis, the reactions of the French and Kent governments are appraised and the attempts that were made to address the issues at hand are discussed. A summary of the asylum problem is given and recommendations are provided about possible solutions that may be employed to further manage this predicament. How these issues affected individuals living within the EU remains a focal discussion point of this section. In doing this, the main issues are identified and summaries of how these issues affected society are provided.

Chapter Ten concludes this thesis. This section recaps on the central themes discussed throughout the earlier chapters. The main issues identified throughout the construction and operation of the Channel Tunnel are outlined and reference is made to how these issues affected and continue to affect individuals living in Nord-Pas de Calais, Kent, France, Britain and the European Union. This chapter provides a summary of the Social and Environmental Issues that have come as a result of the construction and operation of the Channel Tunnel development.

2.0 Background

In this chapter, we shall look at the ancient forms of travel between Britain and France. As part of this, the problems associated with travelling between the two countries and how travel changed over time is examined. Following this, the various attempts that were made to connect France and Britain are discussed. In studying these proposals, notes are made as to why each earlier attempt was abandoned. Although each proposal was postponed for a variety of reasons, a similar set of issues prevailed throughout all early attempts. The political context, financial imperatives and a general level of suspicion from the British towards the French, were all reasons central to the abandonment of these attempts. For this reason, these issues remain central discussion points of this chapter.

The final section of this chapter outlines how the political, social and financial context of the 1980s allowed for the Channel Tunnel to be completed. In this section particular attention is paid to the role that globalisation and the European Union played in facilitating the building of the Channel Tunnel.

The Channel Tunnel has a complex history. In understanding issues that were important in the building of the Channel Tunnel and the impact that these issues had on society in the 1980s, it is important to glance towards the history of the idea itself. Although the Channel Tunnel came to fruition in 1994, history demonstrates that the notion of a fixed transportation link connecting the British and French actually dates back to the time of Napoleon Bonaparte. Since the 1800s a number of different proposals were presented to French and British individuals of standing. The idea of a tunnel always had its promoters and detractors but for a variety of reasons each and every one of the proposals submitted prior to 1986 was abandoned. The earlier attempts are of particular interest as the challenging issues that were associated with the attempts prevailed throughout the construction and development of the Channel Tunnel in 1994.

2.1 Ancient methods of travel

Although the Channel Tunnel was constructed and opened for business in 1994, the concept of constructing a fixed transportation link between Britain and the European Continent dates back over two and a half centuries. It is arguably the most significant international transportation project since the Panama Canal. The tunnel is a tool that has united two influential commercial world powers that are a mere 34 kilometres apart (Neerhout, 2001, 2). Until the twentieth century the only means of travelling between France and Britain was by boat. The shortest route across the English Channel was also the most perilous route (Neerhout, 2001, 2). Characteristically, travellers could expect to travel for six or seven hours to get from one destination to the other (Neerhout, 2001, 2).

The English Channel is known to mariners as “one of the world’s most dangerous passages, with its tidal streams, untidy currents” and it’s frequently enveloping “thick fog” (Hunt, 1994, 11). In 1873, while sailing across the

English Channel Edward Gibbon wrote to Lord Sheffield saying what “a cursed thing to live on an island! This step is more awkward than the whole journey” (Hunt, 1994, 11).

The swift winds, strong tides and dense fog means that the English Channel serves up a concoction of challenges. For travellers and cargo ships these elements often served as deadly combinations. Dense fog fills the English Channel on average one day in every fourteen (Jensen, 2). In line with this, travelling between France and Britain is highly subject to weather conditions. Travellers can sometimes be delayed for days (Neerhout, 2001, 2). On 11 January 1971, a tanker *Texaco Caribbean* collided with the Peruvian naval ship *Paracas* resulting in nine recorded deaths (Jensen, 2). Sometime during the night *Brandenburg*, a German cargo ship, struck the wreck of the *Texaco Caribbean* causing 17 more deaths (Jensen, 2). The discomfort and uncertainty of crossing the Channel was an accepted price paid for Britain's isolated location.

Figure 2.1.1 Area of interest



(Microsoft, 2005, 1).

Figure 2.1.1 above provides a geographical representation of that area that is under examination throughout this thesis. The English Channel is clearly shown and the representation allows us to identify how this piece of ocean divides Britain and Europe.

The nature of travelling between these two nations changed with the advent of the airplane. During the later part of the twentieth century, flying became a commercial enterprise. Travellers were the main beneficiaries of this technological development. Although airplanes were used to ferry some cargo, the volume of materials they were able to transport was, and continues to be, limited. In light of this, trade between France and Britain was still

typically done by sea, via the English Channel crossing. Towards the end of the twentieth century the airplane industry became increasingly competitive. The changing nature of this industry meant that travel between France and Britain became relatively inexpensive and a viable means of travel for the average household.

2.2 Early attempts

The idea of connecting Britain to France is an age old-idea that has taken centuries to come to fruition. The concept of constructing a fixed link to connect the two countries can be traced back over two centuries. The first recorded transportation link proposal dates back to Napoleon's time. In 1802, during a short period of peace between France and Britain, a French engineer by the name of Albert Mathieu-Favier presented Napoleon with a tunnel scheme that was designed to link the UK with Europe (Anderson & Roskow, 1994, 3). Mathieu-Favier's proposal suggested that two tunnels needed to be constructed. The first tunnel was to be lit by candle light and ventilated by chimneys stationed at regular intervals (Neerhout, 2001, 2). This tunnel was designed for horse drawn carriages while the second tunnel was needed to drain away water seepages (Anderson & Roskow, 1994, 3). The plan proposed an artificial island midway through the tunnel so that horses could be changed (Neerhout, 2001, 2). This scheme only ever existed on paper, the technological aspects of the proposal were never fully investigated and further geographical and technological knowledge was still needed.

In 1857, Joseph-Aimé de Gamond presented Napoleon III with more tunnel plans. Gamond had done extensive research on the viability of a tunnel examining the financial, technological and geographical aspects relevant to digging a tunnel under the English Channel (Invicta Media, 2002, 2). He had extensively researched a range of options but concluded that the most feasible alternative was to build a tunnel (Hunt, 1994, 26). Gamond's examination included economic approximations and travel forecasts (Hunt, 1994, 26). He estimated that the tunnel would come at a cost of "170 million gold francs (then equivalent to about £8½ million)" (Hunt, 1994, 26).

Napoleon organised a meeting with the British statesman Charles James Fox to discuss the programme (Jensen, 2). This meeting served to be the first time in which both nations had met to discuss the idea of a transportation link that would physically connect the United Kingdom with Europe. Despite Napoleon's enthusiasm, a large number of British citizens, political leaders and members of the military were suspicious of Napoleon's motives (Neerhout, 2001, 2). This skepticism inevitably meant that this tunnel initiative was dropped.

The next recorded attempt to connect Britain and France was made in 1881 when the French and British governments of the time agreed to construct experimental tunnels (Kirkland, 1995, 1). Sir William Watkin led a team that embarked on some exploratory work at Shakespeare Cliff in 1881 (Neerhout, 2001, 2). Following this, in 1883 Colonel Beaumont led a construction team that bored nearly two kilometres of tunnel from Dover towards France using a

recently modified rotary boring machine (Noulton, 2001, 3). The French began working on a similar tunnel starting from Sangatta, heading towards Dover (Noulton, 2001, 3). Financial imperatives questioned the viability of this proposal. To combat this, a company was established and a small quantity of money was raised through share floats.

In 1882, the French Prime Minister Gambetta resigned and the governmental institutions within France became somewhat precarious (Hunt, 1994, 46). As a consequence of the insecure French political arena, the Commercial Trade Treaty between France and Britain was cancelled and tariff barriers between the two countries rose dramatically (Hunt, 1994, 47). In 1883, further excavation of the tunnel was forbidden (Invicta Media, 2002, 4). The primary reason for this was because British defense establishment was strongly opposed to the development. British defense organisations played a crucial role in persuading the British government to suspend the project by putting pressure on the government (Noulton, 2001, 3). The age-old suspicions between the British and French were reaffirmed and the lukewarm interest that had been shown towards bridging the English Channel was once again rendered invisible in light of concerns towards Britain's national defence.

By 1973 it appeared that the obstacles to constructing a tunnel had been overcome and the idea of a tunnel was once again under investigation. This attempt was activated in 1974 but had been discarded by the end of 1975 (Hunt, 1994, 146). A £500,000 tunneling machine was purchased by the British government and 250 metres of tunnel was dug at Dover prior to the project's abandonment (Kirkland, 1995, 2). The primary reason for the rejection of this scheme has been attributed to financial concerns of the then British Labour government. The government was seen to have other priorities and the idea of a transportation link that connected France and Britain was not deemed to be a fundamental development component of the 1970s.

2.2.1 Summary of historical dates relevant to the idea of physically connecting France and Britain

1802: Albert Mathieu-Favier presents Napoleon with the vision of building a tunnel to connect Britain and France

1803-1815: Napoleonic Wars continue throughout Europe

1857: Napoleon III presented with plans to build a tunnel, by Joseph-Aimé de Gamond. Gamond proceeds to do exploratory work at Shakespeare Cliff

1881: The French and British governments agree to construct experimental tunnels. Sir William Watkin leads a team that embark on some exploration work at Shakespeare cliff

1957: France joins the European Union

1973: Britain joins the European Union

1974: The French and British governments agree to construct experimental tunnels but discard the idea by the end of 1975

1979: Margaret Thatcher's becomes Prime Minister of Great

1981: Francois Mitterrand becomes President of France

1986: Prime Minister Thatcher and President Mitterrand met at the Lille summit meeting to discuss the Channel Tunnel.

Information sourced from (Hunt, 1994, 46).

This timeline outlines important dates relating to the idea of building a fixed transportation link between Britain and France.

2.3 Reasons behind the abandonment of earlier attempts

Despite French enthusiasm for a tunnel, there were a number of reasons that the Channel Tunnel was not completed until well into the twentieth century. Although each earlier attempt was abandoned due to particular social, financial and political climates, history illustrates that a number of similar issues prevailed in the abandonment of each earlier attempt. Uncertainty within the political arena, a general level of apprehension from the British towards the French and financial imperatives were the main aspects that played a portentous role in influencing the decisions to abandon the notion of building a physical transportation link to connect the two countries.

Europe has a colourful past inundated with violent wars and political instability. Our history books are filled with references to the great wars that plagued Europe for centuries. In light of this volatile environment, political security became a mechanism that was seen to reflect the likelihood of a nation becoming a potential threat. Characteristically, the more unstable the political arena was, the more precarious the area in question was viewed as being. In accordance with this, the idea of connecting France and Britain was only recognised when the political context allowed for it. The attempt in 1880 was abandoned as a direct result of changes in the French political environment. This reiterates the fact that the political climate played an imminent role in all the abandonment of the Channel Tunnel attempts prior to 1994.

For decades the British have had security fears about the French. The British looked upon their continental neighbours with “considerable suspicion” (Neerhout, 2001, 1). “They were semi-detached, part of Europe when it suited them, distinct from Europe when it did not” (Neerhout, 2001, 3).

History illustrates Europe as an arena of major political and military unrest. Throughout the conflicts that have been fought and resolved within Europe, Britain preserved a sense of security. The primary reason Britain was able to maintain this was because of its geographical location. Protected by the Atlantic Ocean, English Channel and the Irish Sea, Britain resides in splendid isolation secure from land invasion. This protective barrier of ocean was different from anything their European counterparts were resourced with. Two notable occasions this defensive shield helped to ensure that the British were protected from European wars was during the Spanish Armada in 1588 and again in 1940 when Hitler’s armed forces occupied Northern Europe (Noulton, 2001, 2). Shakespeare makes reference to Britain’s geographical defense layer in *Richard II*, Act 2, Scene 1, where he writes.

This precious stone set in the silver sea,
Which serves it in the office of a wall
Or as a moat defensive to a house,
Against the envy of less happier lands (Dictionaries, 1).

This splendid location allowed Britain to intervene in European conflicts when needed yet preserve a level of security unknown to their European neighbours.

More important than the physical separation of the two nations was the psychological separation that the English Channel manifested in the minds of the British public. The idea of connecting France and Britain was seen to jeopardise the natural defense barrier that had for hundreds of years protected British shores from invasion. In addition, the Channel Tunnel was seen as a psychological threat in the minds of the British public and British political representatives. In the late 1800's Admiral Cooper Key substantiated this in his letter to the First Lord of the Admiralty by writing, "Any machinery for destroying the Tunnel in an emergency could not be relied upon. After seizing the Tunnel, the enemy would march on London, with the Navy a powerless spectator" (Hunt, 1994, 46). This letter was presented to the British Commission in an attempt to voice concerns about building a fixed transportation link that would connect the two nations. Lord Palmerston, the Tory Prime Minister is quoted as greeting one proposal with the comment 'You surely do not expect me to agree to shorten a distance I already consider short enough?' (Noulton, 2001, 2). These concerns were reestablished and heightened during times of political unrest in Europe. In accordance with this idea, the political situation played a fundamental role in hindering or allowing for the establishment of a Channel Tunnel. Interestingly, but not surprisingly, the history of the Channel Tunnel reflects European history, mirroring, as it does, the relationship between France and Britain.

Financial considerations were also an important and challenging aspect of the Channel Tunnel attempts as previously discussed. The bi-lateral nature of this development played an important role in enhancing the financial tribulations associated with the building of a tunnel. From the outset, financial imperatives had been important. In 1856, the estimated cost of a tunnel was £8½ million, in 1948 the estimated cost was to be £50 million and by 1960 it was anticipated that the tunnel would come at a cost of £200 million (Hunt, 1994, 109). Recognising that these amounts are specific to the value of the dollar at the time, a tunnel connecting the two continents was an expensive endeavour.

In 1975 the British government reaffirmed that there would be no public funding for any form of tunnel venture nor would there be any guarantees made of a financial or commercial nature (Noulton, 2001, 16). The French government was initially prepared to contribute some public funding to the development but after consultation with the British government they accepted the British insistence that the venture should be exclusively privately funded (Noulton, 2001, 16). To date this prospect remains one of the most financially complex developments ever undertaken. Funded exclusively through the private sector under a bilateral arrangement, the financial advisors were, in a sense, pioneers that had to work in an unpaved, heavily legislated environment.

2.4 The context of the 1970s and 1980s that facilitated the establishment of the Channel Tunnel

In addition to financial considerations, the political context of the 1970s played an important role in facilitating the establishment of the Channel Tunnel. In addition to the political context, the wider social, environmental and economic realms of contemporary society also acted as influential change agents. The political leaders of the time, the establishment of and strengthening power of the EU, globalisation and increases in consumer demands, all endorsed and supported the idea of a tunnel that would connect Europe and the United Kingdom.

Although it was not anticipated at the time, Margaret Thatcher's appointment as Prime Minister in 1979 laid the foundation that would allow for the Channel Tunnel to come to fruition before the end of the twentieth century. Part of the reason that positive outcomes from negotiations between the British Prime Minister Margaret Thatcher and the French President Francois Mitterrand were not anticipated was because these two leaders came from totally opposing ideological positions. Thatcher was a cavalier political leader who strongly supported the eradication of socialist ideologies. On the other hand, Mitterrand's leadership pushed France in a socialist direction. That said, these two leaders did strongly support international trade. This factor alone meant that the idea of physically bridging the Channel Tunnel became an attractive proposition for both political leaders.

In 1981 the Prime Minister Thatcher and President Francois Mitterrand met to set up a Joint Technical Commission. The sole purpose of this commission was to discuss the viability of a fixed transportation link between the United Kingdom and Europe (Jensen, 3). Five years later in 1986, Prime Minister Thatcher and President Mitterrand met at the Lille summit meeting to discuss the Channel Tunnel (Hunt, 1994, 178).

A joint statement was released announcing that the mandate had been awarded for the "development, construction and operation of a fixed link across the English Channel" (Hunt, 1994, 178). The establishment of the European Community (EC)³ played a principal role in allowing for and increasing, the need for a transportation link between Britain and France. Few countries realised that they were joining a dynamic process designed around European integration that would in years to come play an increasingly powerful role. Since its establishment the EC has played an eminent role in European politics and it is currently playing an increasingly prominent role as an international actor on the world stage.

In 1981 the European Parliament asserted that they were enthusiastic supporters of a fixed link (Grayson, 1990, 5). In essence the European Parliament saw this form of venture as an instrument that would lead to

³ The European Community (EC) was originally founded March 25, 1957 under the alias of the European Economic Community (EEC). In 1992 the 'economic' was removed and the EC became the title for what would in the years that followed become formally known as the European Union (EU) (Europa, 1).

greater unification between Europe and the United Kingdom. Many British citizens still remain far from enthusiastic supporters towards the ideas that underpin the European Union (EU). While a large number of EU countries are fully supportive of a single European currency (the Euro)⁴, the British still possess reservations towards the idea. In line with this, the British have chosen to withstand pressure from the EU holding the Pound as their primary currency. The EU has in many ways integrated Europe with the United Kingdom. This new found unification has laid to rest some of the apprehensions that the British had towards physically and mentally connecting themselves to Europe.

In addition to the European Union, globalisation was a driving force that heightened the need for a financially competitive and assessable means of transporting products between France and Britain. A direct consequence of globalisation is that goods and services that were once protected by local markets now compete on a global stage for market share. Businesses have become increasingly aware that trade between Britain and their European neighbours is a crucial mechanism that could help to ensure market strength and buoyancy. Trade within the EU was growing and the British were increasingly isolated from easy access to these markets (Neerhout, 2001, 2). British exporters were at a great disadvantage because of the travel times and ferry charges associated with transporting freight by water across the English Channel. (Anderson & Roskow, 1994). Astoundingly the actual ferry crossing times in 1975 were no quicker that they had been in 1875 (Neerhout, 2001, 3). In light of this, the demand for a fixed transportation link between the two neighbours gained an immense amount of support from the British business community.

Aside from trade, a number of other independent enterprises sanctioned the development and building of the Channel Tunnel. Construction companies welcomed the proposal foreseeing that there was an immense amount of work and financial benefits to be accrued (Anderson & Roskow, 1994, 34). Business travellers were another group that were particularly supportive of a tunnel link between the two continents. Flying time, long waits in crowded terminals and travelling to and from airports meant that travelling between the two countries could consume almost an entire working day. In addition, travel forecasts predicted that demand for travel between the two countries would dramatically increase by the end of the twentieth century (Neerhout, 2001, 3).

⁴ The European Union (EU) was originally established as the EC until the title was EU was adopted in 1992 (Europa, 2). The EU has a single Commission, Council of Ministers and Parliament (Europa, 1). See Appendix Two for a diagram that illustrates the evolution of the structures of the European Union.

2.5 Conclusion

The idea of constructing a fixed transportation link to connect Britain and France is an ancient idea that has taken centuries to come to fruition. Travelling by boat between Britain and France was a long, treacherous journey. Although this environment changed with the introduction of the airplane there still remained a demand for a cost effective, time efficient way to travel from Britain to the continent. In light of this demand, a number of proposals were submitted and scrutinised. In 1881 and 1974 two major attempts to build a tunnel were made. The major reason for the abandonment of the 1881 proposal was political instability and financial pressures. The attempt in 1974 was suspended because the French President resigned which resulted in heightened political instability in France.

Leadership changes in the 1980's directly influenced the ability of both countries to work together in recognising the long terms benefits that would be associated with the building of a tunnel. In addition to the changes in the political arena, globalisation and the establishment of the EU acted as influential change agents that allowed for and heightened the need for a fixed transportation link between the two continents. The Channel Tunnel is a significant development that has changed the nature of travel and trade for the UK and wider Europe. The financial and political issues associated with this form of development plagued developers for years. It is a tribute to all the actors involved that the Channel Tunnel actually came into existence. The Channel Tunnel is now an influential part of European infrastructure and is symbolic of a new found unity and common purpose that would have been impossible prior to 1989.

3.0 Legislative background

Back in the 1800s, when the idea of physically bridging the English Channel first became a discussion point, it was identified that the engineering, financial, project management, social and environmental components of this development would venture into new territory. In addition to these facets, the legal aspects of this project were also addressed in an interesting manner. For this reason the legal framework underpinning this development is the main topic of this chapter.

The manner in which EIA was addressed throughout the project development had a large impact on the issues that eventuated from the Channel Tunnel venture. In light of this, the role that EIA played in the construction of the legislative framework is extensively examined. Following this, the systems implemented that allowed for individuals to voice their concerns are critiqued. In addition, discussion is provided about how the Channel Tunnel Act was established, the role that this piece of legislation played and the issues that arose from the operation and implementation of the Act. The following section also investigates the issues that arose in the development of the legislative background and how these issues in turn affected society. In addition, financial aspects of the development are appraised. The final part of this section demonstrates why the Act of Canterbury was constructed and the role that the legislation played throughout the design and construction of the Channel Tunnel.

3.1 Environmental awareness and developmental consents processes

The developmental processes underpinning the Channel Tunnel development can be better understood when one understands the context of the time period within which the development was conducted. The political context of the 1980s and 1990s has been characterised by the 'new radical right' which is representative of a shift in focus towards a particular political philosophy and environmental planning (Essex & Gibb, 1994, 51). Economic prosperity was the primary focus of the governments of the time. One way in which governments sought to enhance economic growth was through the promotion of the free market. Governments sought to achieve this by promoting "the free market and reduce[ing] levels of public expenditure" (Essex & Gibb, 1994, 52). The Channel Tunnel is an example of one project that came to be conducted without any form of public funding.

In Britain and France throughout the 1980s there was no uniform consents procedures that could be applied to public or private development. Prior to this time there was a limited level of concern towards the social and environmental impacts associated with different developments. This changed in the latter part of the twentieth century as government officials, community organisations and the general public became increasingly aware of, and concerned with, the impact that developments were having on society and the environment (Sheail, 2002, 147). As awareness increased, so to did the numbers of environmental organisations and their memberships. This is reflected by the

fact that one environmental organisation, the Royal Society for the Protection of Birds, recorded a membership increase from 10,500 in 1960 to 56,000 in 1970 (Sheail, 2002, 147).

Increasing public environmental awareness fuelled the need for governments and the agencies driving development to be made accountable for the adverse effects that came as a consequence of their particular developments. In line with this, a more strategic view of planning emerged within the British government and the wider constituency of the conservation movement and industry (Sheail, 2002, 147). In addition, as environmental awareness heightened the assortment of environmental organisations that were concerned with the social and environmental impacts of development began to have the opportunity to have their voices heard (Sheail, 2002, 271). Public participation also became a corollary of this heightening of awareness and in turn, the general public began to play a more active role in project development.

The Channel Tunnel proves to be one of the earliest British examples in which this changing philosophy is palpable. The Channel Tunnel Act has paved a unique place in developmental history. In some instances the legal foundations underpinning this development stopped issues from developing but also made Eurotunnel accountable for employing strategies to mitigate and manage issues as they arose. On the other hand, a number of issues arose because the legal foundations allowed them to do so.

The Channel Tunnel Act is a significant piece of legislation that explicitly illustrates the movement towards greater social and environmental awareness. In the 1980s there were no regular processes governing large scale developments in Britain or France. The planning procedures employed throughout the development of the Channel Tunnel have been extensively examined and thoroughly critiqued. Critics have indicated that the consents process lacked information and knowledge which eventually led to regions around the Channel Tunnel entrance ways not knowing how to maximize the benefits of the Channel Tunnel development (Essex & Gibb, 1994, 63).

Criticisms of this nature have in part been attributed to the fact that there was a “lack of orientated transport policy, the absence of an agreed strategy or planning framework to oversee Channel Tunnel developments and the financial restrictions imposed on British Rail...made the planning task extremely difficult” (Essex & Gibb, 1994, 65). To this day there are still no comprehensive formal consent processes or planning procedures governing developments of this nature in either nation. There are though, a number of provisions that can be applied to private and public developments. The lack of tried and tested planning procedures had a considerable impact on the legislation that was eventually constructed as is illustrated throughout the following pages.

The main body of legislation that was the backbone to the Channel Tunnel Act was the Town and Country Planning Act 1968 (Popham, 2002, 141). A large number of principles underlying the Channel Tunnel Act originated from this

act but were revised and reworded to fit the Channel Tunnel development. When reading the two pieces of legislation together, examples of common themes between the two pieces of legislation become clearly visible. The principle underpinning land acquisition is an example of one provision that was taken from the Town and Country Planning Act and modified to fit the Channel Tunnel Act (Channel Tunnel Act, 1989, 1900).

It is interesting to note that in accordance with the legal guidelines governing development, France and Britain evaluated alternative means of physically bridging the English Channel in an 'in house' manner (Gossop, 1986, 225). That so, the decision made was at the discretion of the French and British governments leaving little or no room for input from the general public. This procedure has been criticised because it lacked public involvement (Gossop, 1986, 225). It has also been argued that this process excluded a comprehensive evaluation as to whether the project was actually required (Gossop, 1986, 225).

If this development had been conducted with public funding the accepted procedure would have called for some form of public enquiry (Gossop, 1986, 225). As no public funding was made available, no public inquiry was required and the legal hearings proceeded via a private parliamentary bill (Gossop, 1986, 225). It has been suggested that a public enquiry was "avoided in order to prevent delays in the construction of the Channel Tunnel " (Essex & Gibb, 1994, 53).

Lack of consultation about alternative proposals meant that members of the general public were not able to voice opinions or concerns about each proposal. The design, construction and operational components of each proposal submitted were diverse (Grayson, 1990, 5). With this in mind the collection of issues that came as a result of each development were different. As the public was not part of the project submission process, there was no opportunity for the public to converse with the bodies driving the development.

Part of the justification given for choosing the Channel Tunnel development was that the impact on marine life was minimal. The flip side of this is that there was an immense amount of concern expressed about noise eventuating from Channel Tunnel operations (Eurotunnel, 2003, 6). If the government had chosen a bridge, the constructional impacts may have been more detrimental to the environment but noise may not have been a continuous long term issue for local residents. While the developers may have thought that marine ecology was an important fact to consider, it cannot be known if the general public would also have held the same perception. This helps to show that just because one individual places importance on one issue or aspect of a proposal, it does not necessarily mean that everyone holds the same opinion. This is an important point that needs to be addressed and allowed for throughout the selection, design and construction phases of all developments.

3.2 The Channel Tunnel Act

Given that the decision had been made to bridge the English Channel with a tunnel, the next question to be addressed was what legislation would be applied to this development. The Channel Tunnel Act received the Royal Assent on 23 July 1987 (Patterson *et al.*, 1992, 6). The passing of the Act meant that building the Channel Tunnel was now formally ratified and Eurotunnel, who held the mandate to construct and build the Channel Tunnel, was given the final stamp of approval. This piece of legislation granted the concession for Eurotunnel to hold operational rights to the Channel Tunnel until 2042 (Patterson *et al.*, 1992, 6). In other words, the Act stipulated that Eurotunnel had the right to a 55 year reign over the operation of the Channel Tunnel. In essence the Channel Tunnel Act provides:

for the construction and operation of a railway tunnel system under the English Channel, together with associated works; to provide for connected improvements in the road network near Ashford, in Kent, and in the rail network in South Eastern Britain; to incorporate part of the railway tunnel system into the United Kingdom and to provide for the application and enforcement of law in relation to, and matters connected with it; to provide for the construction of certain highways and associated works in the vicinity of Folkestone; and for connected purposes (Channel Tunnel Act, 1989, 1903).

The primary purpose of the Act as defined by the legislation is to “provide for the construction and operation of the [Channel] Tunnel rail link” (Channel Tunnel Act, 1989, 1908). This piece of legislation provides the legal framework in which the Channel Tunnel development was designed around, constructed and operated under. The Channel Tunnel Act is an all-encompassing piece of legislation that had an immense impact on the developmental processes of this venture. These impacts occurred because the Channel Tunnel Act provided a number of comments and restrictions on aspects of the development such as roading.

These aspects included financial components, system design, time dimensions, the role of the contractor, definitions relating to important components of the project such as “shuttle train”, construction regulations such as land acquisition, planning permission, safety provisions, nature consultation, highways, public compensation and participation. This document defined the process in which land could be temporarily acquired for construction purposes, the procedures for which individuals and groups could seek compensation and the consents process that needed to be fulfilled prior to construction commencing. It also set out a number of important guidelines relating to tunnel ownership, facets the tunnel was required to have, regulations of operation and the role of local government organisations (“Channel Tunnel Act, 1989, 1900). One important aspect in the construction

of the Act was that the legislative framework allowed for public petitions to be heard by the select committee. The impact and role that these petitions played is examined further in the following sections.

On the whole this document proved to be the most influential piece of legislation applied throughout the development of the Channel Tunnel. It proved to have a direct impact on the design, construction and operation of the development. The sole purpose of the Channel Tunnel Act was to provide for and govern the Channel Tunnel development.

Figure 3.2.1 Timeline of planning procedures for the Channel Tunnel



Sourced from (Kershaw & McCulloch, 1993, 21).

The Channel Tunnel Act was constructed as a hybrid bill⁵.

⁵ A hybrid bill is a bill that affects the private interests of a particular person or organisation. It is initiated by non-Parliamentary petitioners such as local authorities or public organisations and is treated as a private bill for part of its passage through Parliament. This gives people an opportunity to oppose the bill or to seek its amendment before a select committee in either one or in both Houses. Once the bill passes through the select committee and the House of Commons it most often becomes treated as a public bill. It is not routine but possible for Hybrid bills to also be termed as a "private bill". A private bill is the term used for legislation that originates from a particular member of a legislature or parliament or from a member of the public. Private bills developed in the United Kingdom as a means of obtaining redress from a specific wrong or obtaining a benefit that was not otherwise available through statute or the common law (Encyclopedia, 1).

Generally private bills are applied to authorise works but there are a small number of cases in which hybrid public bill procedures have been applied (Popham, 2002, 6). Examples of such projects include the Port of London bills 1903 and 1908, the London Passenger Transport bill 1931, the Bank of England bill 1945 and the Transport (London) bill of 1968-69 (House of Commons, 2003, 2). The Channel Tunnel Act was passed a Hybrid bill which was termed to be a Public bill. Although it is labeled to be a Public bill there were private sections added to the bill during its creation (Wilson, 1991, 31). A hybrid bill is in most instances deemed to be a Public Bill this is because it relates to the issue of public policy (Popham, 1986, 351). The Channel Tunnel development affects public policy as it was seen to directly impact on people's rights and property (Popham, 1986, 351).

From the promoters point of view there are two distinct advantages of having a development proceed as a hybrid bill. Firstly, there is "greater certainty of success than by way of the planning procedure" and the on the whole the process is normally quicker" (Popham, 1986, 351). On the other hand, from the public's point of view the hybrid bill procedure does not leave opponents in an optimal position. A quick passage through the select committee can mean that petitioners' cases are sometimes not given an adequate hearing.

There are a set of procedures to review and pass a parliamentary act when a development is deemed to be a hybrid bill. Firstly, the proposal is reviewed by the House of Commons and/or the House of Lords. At this stage it has already been decided that the project is going to go ahead. After the second reading the proposal is passed on to a select committee which is made up of a number of members of parliament. Following this, the select committee are entrusted with the responsibility to "hear the affected parties who petition, and to reduce as far as possible the hardship and inconvenience which would be inflicted on them if the bill passed into law" (Popham, 1986, 351).

One major criticism with using the hybrid bill procedure is that the select committee and the government decide upon the need for the development and the project details are passed on to the House of Commons and the House of Lords. Petitioners are then given the opportunity to express their concerns but they were not able to prevent the actual development (Essex & Gibb, 1994, 53). This means that they are able to push for changes in the project design but not able to challenge the idea of building a tunnel. Overall the select committee heard 4852 petitions which eventuated in 70 changes being made to the Channel Tunnel Act (Essex & Gibb, 1994, 53). The majority of these changes were deemed to be of minor significance and it was judged that the remainder of the petitions were not significant enough to warrant modifications being made to the Act.

Due to the scope of this report it is not realistic to examine all the provisions illustrated within the Act or to provide an extensive examination into the means of construction of all the legislative provisions. That said, the provision for the land entitlements will be examined to enhance our understanding of the role and nature of the Channel Tunnel Act. It is important to remember

throughout reading this piece that the systems employed throughout the establishment of the Channel Tunnel were done so in compliance with this legal statute. This being said, Eurotunnel was not necessarily concerned with the social and environmental impacts associated with the Channel Tunnel development but they had to manage the impacts in accordance with the regulations set out by the Channel Tunnel Act.

3.3 The process of contestation

One important issue that arose as a result of this development was public concern towards the impact that this venture would have on the environment and the social contexts of Nord-Pas de Calais and Kent. The Channel Tunnel Act was the tool that determined how, when and where individuals could contest this development. As earlier stated the Channel Tunnel Act is a hybrid bill and as such the accepted legislative procedure was that objections should be heard and considered by a select committee constructed from within the House of Commons and the House of Lords (Wilson, 1991, 31). In line with this, objections to the Channel Tunnel development were presented, heard and considered in accordance with this procedure. Any individual or group wanting to have their case heard had to be deemed "*locus standi*" (Popham, 1986, 351). *Locus standi* implies that the bill will impinge on an individual or group's interests or property (Popham, 1986, 351).

The definition of '*Locus standi*' had a direct impact on the way the individual concerns were addressed. Only the parties that were deemed to be directly affected by the developments had the opportunity to petition against the proposal (Popham, 2002, 7). This put the objectors of the proposal at a direct disadvantage. Had the Channel Tunnel been as a public bill then anyone who wanted to have their concerns heard could have presented their viewpoint to the select committee. Those that were seen to be *locus standi* would have their submissions heard providing the "evidence was relevant and not repetitious" (Popham, 2002, 7). When an act is constructed as a hybrid bill it is up to the discretion of the select committee to deem whether the petitioners' submissions are relevant and if the select committee perceived so the public is given the opportunity to voice their concerns and opinions to the select committee.

Procedures such as this are obviously extremely subjective as someone else is making a judgment as to whether they believe an individual is going to be affected. This procedure remains heavily dependent on an individual's ability to provide a brief outline of their concerns. Given that the general public often does not have the public speaking skills or knowledge of how to appropriately outline an argument this opens the door for individuals who should have had the chance to voice their concerns with no opportunity to do so. That said, petitioners could only request to have the Channel Tunnel design or operational components of the development amended on the grounds that the impacts would impinge directly upon their rights and interests (Popham, 2002, 7).

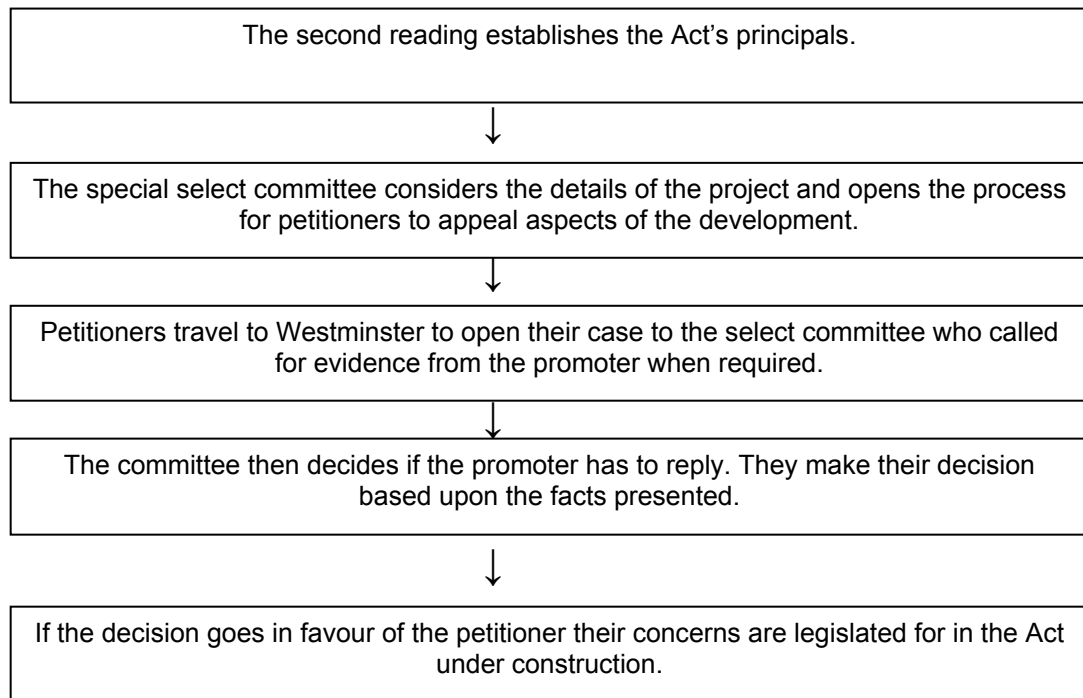
Extensive debate has emerged in relation to the process of contestation that governed the Channel Tunnel development. Numerous scholars have discussed the process employed as under the hybrid bill procedure. One school of thought suggests that local community interests are destined to take a back seat at committee hearings under this procedure (Gossop, 1986, 225). When looking at the reality of power relationships within such a development it seems apparent that some inequality will exist. This rings true as community groups and organisations often have limited financial resources and restricted access to professional experts. In line with this, it seems obvious how the larger more influential organisations with a greater resource base are able to present stronger arguments. The impact of such power relations is an important component to recognise in understanding the development process. This topic will be discussed in further later in this chapter.

Public hearings for individuals or groups who felt that their interests were directly affected by the Channel Tunnel began on 24 June 1986 (Gossop, 1986, 225). In total 5,000 petitions were submitted to be heard by the House of Commons and 1,600 to the House of Lords (Wilson, 1991, 31). The House of Commons select committee met on 35 different occasions to hear objections to the Channel Tunnel development (Wilson, 1991, 31). This development can lay claim to having been involved in the longest select committee hearing case to date. The Commons select committee heard petitions for a staggering 320 hours (Thompson, 2002, 9). The proposal then went to the House of Lords whose select committee heard petitions for a further 248 hours (Thompson, 2002, 9).

Petitioners were able to state their case to the select committee. Time restrictions became a contentious issue as many of the petitioners felt that they were not given an adequate amount of time to provide the select committee with their argument. The sheer volume of petitions resulted in the committee instructing groups to proceed with brevity and speed. It has subsequently been argued that there were indeed times that the court did not accomplish its stated aim of considering “.....the contentious issues in a way which gives every petitioner a fair hearing” (Popham, 1986, 351).

A collection of groups, individuals and organisations went to the court room to state their cases against the Channel Tunnel development. While some of these petitioners came from government organisations a large number of groups were community based. Some of the individuals attending the court sessions included concerned farmers, environmental specialists, local council organisations and other concerned parties. Although the processes governing how individuals could petition against the Channel Tunnel have been extensively criticised, the developers and government officials remain adamant that the correct channels were followed throughout all stages of the hearings.

3.3.1 Diagram of the process of contestation



Information adopted and collated from (Popham, 2002, 6).

The diagram above illustrates the legislative channels that guided the contestation process. (Popham, 2002, 6).

Although the legislative framework was adhered to throughout the consent process this does not necessarily imply that the rights and demands of the individuals living in and around the Channel Tunnel entranceways were met. On the contrary, individuals and minority groups did take a back seat to the more powerful petitioners. Powerful petitioners had technological knowledge, financial resources and were able to present their cases in an articulate and persuasive manner. British railways are an example of one group that presented a powerful case to the select committee.

One issue that further demonstrates the fact that the process of contestation is not entirely fair is that the petitioners had to travel to Westminster this to have their case heard. Given that not everyone has the opportunity to take time off work or the financial resources to travel to Westminster illustrates how this process can be unfair. While there appears to have been adequate measures enforced to ensure environmental sustainability, there is a lack of evidence to suggest that the concerns of local residents were adequately addressed. This is exemplified by the fact that when searching through the environmental reports released by Eurotunnel, environmental concerns frequently feature while social issues are examined only briefly, if at all (Eurotunnel, 2003, 1).

The points made above are further reiterated by Popham whom asserts that the hybrid bill is outdated and “unfair to petitioners.....It also cannot be right that a petitioner against the bill for a major scheme, whose property may be being compulsorily purchased or badly impacted upon, should have a markedly less fair hearing that he or she would have obtained at an inquiry under the general law had the scheme been of less importance” (Popham, 2002, 7). Had this development been conducted as a public bill everyone who wanted to have their case heard would have had the opportunity to do so without having to prove ‘*Locus standi*’.

3.4 The role of Environmental Impact Assessment in the development process

EIA played an important role in the establishment of the Channel Tunnel Act. The value of engaging with environmental impact assessment in the development of the Channel Tunnel was recognised from the outset. The original tenders submitted for the mandate to build the fixed transportation link between Britain and Europe were required to contain an environmental impact assessment that outlined the major issues that would come as a result of each individual proposal. The EC directive declared that these reports had to “cover the direct effects and any individual, secondary, cumulative, short, medium and long-term permanent and temporary, positive and negative effects of the project” (Kershaw & McCulloch, 1993, 19). The impacts identified were categorised in accordance with a predetermined format. These prerequisites meant that all reports identified the site and context of the proposed development, the method of determining impacts, discussion of the projected impacts of both the construction and operation of the scheme and measures that could be taken to mitigate these projected impacts (Kershaw & McCulloch, 1993, 19).

An extensive debate emerged over whether the early environmental assessments should be released to the public. Eurotunnel eventually agreed that the contents of these reports should be made public. Information pertaining to the development and all of the environmental reports about the project were placed in Kent County’s public library (Kershaw & McCulloch, 1993, 19). All of this information was made available to any interested party (Kershaw & McCulloch, 1993, 19). Kershaw suggests that the motivation behind releasing these reports was not so much to inform the public but rather to enhance the level of public trust for both the government and the consortium that has been awarded the mandate to develop and operate the fixed transportation link (Kershaw & McCulloch, 1993, 20). Whatever the case, the public release of these reports had a considerable impact on people’s ability to identify and project the impacts associated with the Channel Tunnel development. While these reports identified the major issues, they also helped people understand how this development would impact on everyday components of their lives. Furthermore, these reports gave petitioners who opposed parts of the development’s design the ability to trace their concerns back to some hard evidence as identified within these reports.

Eurotunnel insisted that consultation was a constituent that was recognised as being an essential part of the development process from the beginning (Eurotunnel, 2002, 6). Statutory organisations and other independent bodies were consulted in relation to the development of the Channel Tunnel. In total 45 organisations were conferred with in an attempt to establish the issues that were deemed to be of importance (Kershaw & McCulloch, 1993, 29). Although Eurotunnel did engage in consultation it can be argued that consultation was not adequately sought throughout all the stages of the development.

One area where consultation was apparent was in relation to environmental issues. Environmental consultants were used throughout the consents process in relation to the construction of the EIA (Kershaw & McCulloch, 1993, 19). In total 46 recommendations were made by the Environmental Consultants and 42 of these recommendations were incorporated into the Channel Tunnel Act, the remaining concerns were deemed to be not applicable (Kershaw & McCulloch, 1993, 19). The early 1985 specialist reports examining the environmental issues associated with the Channel Tunnel were collated, the main impacts that appeared in these reports are summarised as follows,

1. Landform evaluation
2. Groundwater and hydrogeology
3. Soils, land quality and agriculture
4. Terrestrial ecology
5. Coastal hydrograph
6. Marine ecology and fisheries
7. Archeological features
8. Architectural heritage
9. Population housing and recreation
10. Electricity infrastructure and telecommunications
11. Water and gas infrastructure
12. Energy consumption
13. Design principles and visual impact
14. Transport networks
15. Residues and emissions- sound and vibration
16. Residues and emissions- air
17. Residues and emissions- water
18. Residues and emissions- spoil and waste. (Kershaw & McCulloch, 1993, 20).

These issues became a focal point of parliamentary discussions throughout the consent phase of the development.

Recognition of these issues is easily identifiable when examining the Channel Tunnel Act. Within the Act provision is made for all of the issues identified above (Channel Tunnel Act, 1989, 1900). The primary reason that these issues remained major discussion topics throughout the parliamentary process is because they all affected the social and environmental contexts. The terms “population, housing and recreation” give us indications of the aspects of people’s lives that would be affected by the development. Housing

is used as a term of reference for the impact that the Channel Tunnel was projected to have on households. For example, part of this terminology related to the everyday disruption that households would be subject to.

While at first glance these issues appear to impact predominantly on the environment in closer examination it becomes apparent how these issues also all directly affect the social. While recreation relates to the environment it also has a direct impact on people's ability to use recreational facilities. The EIA reports created prior to the construction of the legislative framework allowed developers, government bodies and the public to identify the range and variety of issues that were projected to occur as a result of the construction and operation of the Channel Tunnel.

Lessons can be learnt by examining the early EIA's after the event. Given that the Channel Tunnel was constructed under the English Channel sea bed, the impact on marine life and ecology was minimal. The other side of this is that because a tunnel structure was chosen there were a large number of logistical issues that arose. These logistical issues meant that a large volume of land needed to be acquired for construction purposes. It was these reports that originally identified the volume of land that was needed. These reports also allowed local residents to identify what impact the development was going to have on the environment and their lives.

The major criticism of the EIA in relation to the Channel Tunnel development is that the reports lacked accurate project definitions and the time constraints placed upon the project were too stringent (Kershaw & McCulloch, 1993, 29). Channel Tunnel Group- Franche-Manche (CTM-FM) released comments on the early EIA's stating that these studies were "generally thorough, methodical and supported by good technical detail, meeting the government's requirements in almost all areas" (Kershaw & McCulloch, 1993, 20). This claim has been rebutted by critics of the scheme and one school of thought that has emerged criticises the initial consultancy reports and policy recommendations as they were all encompassing which meant they were not specific enough to directly influence the governments' and select committees' decision making processes (Essex & Gibb, 1994, 58).

All the major impacts identified within these reports were addressed throughout the parliamentary consents process (Kershaw & McCulloch, 1993, 20). This illustrates the crucial role that EIA played in the consent process, development and design phases of the Channel Tunnel development. The early EIA reports laid the foundations for the issues that would be addressed and mitigated for throughout the later construction and operation phases of the Channel Tunnel development.

3.5 Consents process

Although the legislative framework governing this development was in some aspects comprehensive, this was not the case with regards to the consents process that provided the framework for the construction of the Channel Tunnel Act. One important issue that sat behind the construction of the Channel Tunnel Act was the consents processes adhered to before the Bill reached the House of Commons and the House of Lords. At the time this development was initiated there was no uniformed consents procedure about how to deal with major developments in place in either France or Britain. The lack of strategic planning is shown by the procedures adopted by both governments to establish legal authorisation for the Channel Tunnel (Essex & Gibb, 1994, 53). It has also been suggested that the construction of new legislative procedures requires “the fullest consideration of all the consequential procedures” (Kershaw & McCulloch, 1993, 30).

The lack of systematic procedures also means that major projects such as the Channel Tunnel are characteristically dealt with in the same overall manner that smaller developments are conducted under. It was ultimately the consents processes that allowed for the Channel Tunnel Act to be constructed as a Hybrid Bill.

Vickerman and Popham have produced a large amount of, often critical literature, on the planning policies employed throughout the construction of the Channel Tunnel. Their evaluations identified that there were a number of fundamental and structural inadequacies in the planning policies utilised throughout various stages of the development. It has been argued that inadequate planning policies overlook the needs of minority groups such as the poor, the elderly, unemployed and disadvantaged (Essex & Gibb, 1994, 52). In addition, there appears to be a lack of “local accountability as decision[s] are reached by market criteria or by central government intervention” (Essex & Gibb, 1994, 52). Another point made by Essex is that policies tend to be focused on short term profit maximization which in many instances can preclude “the longer-term investment necessary to achieve self-sustaining economic prosperity” (Essex & Gibb, 1994, 52).

There was no effective national transport policy in the UK and “decision making relating to transport, policy making and planning degenerates into the realms of the *ad hoc*” (Goodenough & Page, 1994, 47). This is illustrated by the fact that the building of motorways and trucking roads are promulgated by the Department of Transport while railway developments are done under the decree of the specific developer (Goodenough & Page, 1994, 47). The effect of these separate consents procedures is that “no mode of transport is properly considered against the viable alternatives, nor is there an opportunity for effective assessment of alternative ways of meeting desired objectives” (Goodenough & Page, 1994, 47).

3.6 Land acquisition

In an examination of the issues associated with the legislative background it is helpful to take one provision of the Channel Tunnel Act and examine it further. A number of legislative provisions are outlined relating to land acquisition throughout the Channel Tunnel Act (Channel Tunnel Act, 1989, 1901"). These provisions stipulate when, how and for what duration the developers were able take possession of land. Land acquisition of this nature has a massive impact on people. The livelihoods and lifestyles of people were directly impacted through Eurotunnel taking temporary possession of land. While financial reimbursement was given to people who had land taken for construction purposes, this action had a massive impact on the lives of people who ended up in this situation. The primary purpose of this examination below is to show how the Channel Tunnel Act legislated for this issue.

This legislative piece set out the grounds that the Railways Board could "enter upon and take possession of the areas specified in columns (2) and (3) of the table for such purposes as are specified in column (4) and may, for any such purposes, remove any structures on those lands and provide means of access to those lands" (Channel Tunnel Act, 1989, 1900).

Figure 3.6.1 Temporary Land Possession

(1) <i>Works Nos.</i>	(2) <i>Area</i>	(3) <i>Number of land shown on deposit plans</i>	(4) <i>Purpose for which</i>
23, 23A and 23B	London borough of Wandsworth	26	The provision of vehicular access for construction.
25A, 25B and 25C	London borough of Hammersmith and Fulham	48	The provision of a working site and vehicular access for construction.
26 and 26A	District of Tandridge (parish of Nutfield)	4 and 8	The provision of a working site and vehicular access for construction.
	District of Tandridge (parish of Bletchingley)	1, 2, 4 to 7 and 7A	The provision of a working site and vehicular access for construction for Coopers.
			Hill Road at the point marked A on the deposit plans.
28A and 28B	Borough of Maidstone (parish of Lenham)	1,2 and 5 to 7	The provision of a working site and vehicular access for construction to Outward Lane at the point marked A on the deposit plans.
		2 and 4	The provision of a working site and vehicular access for construction to Ham Lane at the point marked A on the deposit plans.
		10 and 11	The provision of a working site and vehicular access for construction to Lenham Road at the point marked B on the deposit plans.

Sourced from (Channel Tunnel Act, 1989, 1902).

The table above was used by Eurotunnel to decipher when, how and for what means they could acquire land for construction purposes (Channel Tunnel Act, 1989, 1902). The Act also legislated for the 'environmental' regulations that had to be adhered to when land was returned to its original owners. In addition, when permanent land ownership was necessary the Act illustrated how the figure for compensation would be decided upon (Channel Tunnel Act, 1989, 1902).

3.7 Treaty of Canterbury

In addition to the Channel Tunnel Act the Treaty of Canterbury was constructed to govern the political entities involved in the development. The bi-national nature of the project meant that some form of legislative framework had to be constructed to define the roles and regulations of the political entities concerned. This legal framework came under the umbrella of the Treaty of Canterbury. The Treaty of Canterbury was signed by Margaret Thatcher and Francois Mitterrand on 12 February 1986 (Wilson, 1991, 31). This piece of legislation “laid down the legal, financial and administrative basis on which the two nations would co-operate” (Wilson, 1991, 31). While the Channel Tunnel Act primarily relates to the development itself, the primary purpose of the Treaty of Canterbury was to provide a political framework for the French and British governments to work under. This document provides the legislative framework for matters such as the question of jurisdiction, government involvement and national boundaries (Wilson, 1991, 31).

The responsibilities of the British and French governments as outlined in the Treaty of Canterbury as quoted in the statute are as follows:

Article 2 (1) - High Contracting Parties shall take measures which are necessary to ensure that the construction and operation of the Fixed Link shall be consistent with their international obligations”.

Article 10 (1) - an intergovernmental Commission shall be established to supervise....all matters concerning the construction and operation of the Fixed Link”.

Article 10 (3)(f) - considering.....any other matter which appears to it to be necessary to consider.

Article 10 (3) (f) leaves the door open for the French and British governments to ‘intervene’ in the construction and operation of the Channel Tunnel venture providing that they can justify that it is ‘necessary’. An example of this is illustrated in relation to the asylum problem that currently plagues France. This issue and the impacts that this issue has will be discussed in depth in the later sections of this thesis.

3.8 Financial considerations

One of the most significant decisions made by the French and British governments was to allow the project to proceed as a private development. Under this umbrella the mandate to develop and operate the Channel Tunnel was awarded to the successful applicant until 2042 (Holliday & Vickerman, 1989, 3). Opting for this form of concession meant that the British and French governments positioned themselves outside the immediate parameters of the Channel Tunnel development (Holliday & Vickerman, 1989, 3). This decision played an influential role in the legislation that would come to underpin the Channel Tunnel development along with dictating the governments’ future

involvement in the Channel Tunnel venture. From the outset the French and British governments announced that the chosen proposal would have to be funded by the private sector. In accordance with this the Channel Tunnel came to be a privately funded venture.

The scope of this report does not allow for extensive investigation into the financial aspects of this development. Detailed inspection of the financial components of the project would add little value to the evaluation. While it is not ideal to ignore the financial nature of the project, the major point to keep in mind throughout reading this piece is that due to the private nature of investment, Eurotunnel has been made openly accountable for funds spent throughout the design, development and currently, the operation of the Channel Tunnel. In addition to this, there was an immense amount of pressure for Eurotunnel to operate the development in a financially viable way. This has proved to be yet another challenge for the consortium in charge of Channel Tunnel operations.

3.9 Conclusion

The Channel Tunnel Act and the Treaty of Canterbury were instrumental pieces of legislation enacted to govern the Channel Tunnel development. The primary purpose of the Channel Tunnel Act was to provide for the construction and operation of a railway tunnel system under the English Channel. The Treaty of Canterbury defined the roles and regulations of the political entities involved. The governments behind the development called for EIA to be recognised throughout the development phase. The movement towards recognising the importance of EIA came as a result of the increasing level of social and environmental awareness. EIA reports had a direct impact on the legislative process in the way they alerted the select committee and the public of the issues that would come as a result of the Channel Tunnel development.

In accordance with the legal foundations underpinning the development petitioners were given the opportunity to state their cases against aspects of the development that they deemed would be detrimental to society and the environment. These petitions resulted in a number of provisions being adapted in the finalisation of the Channel Tunnel Act. These provisions helped to ensure that Eurotunnel was made accountable for the impacts associated with the building and operation of a railway link that lay beneath the Channel. The inclusion of the large number of provisions reflects an attempt by government to ensure that Eurotunnel constructed and operated the Channel Tunnel in a satisfactory manner, in accordance with acceptable regulations.

It was the philosophy of the governments in power at the time that allowed for the Channel Tunnel to be established as a private entity. This had an important impact on the legislative processes that came to be associated with the Channel Tunnel development. As no public enquiry was conducted it has been suggested that in some instances the legal foundations underpinning the development did not recognise the interests of minority groups. It would be unrealistic to think that every individual concern could be satisfied, yet the overall process would have been improved if the consent process had allowed all individuals and groups the chance to express their concerns and opinions.

4.0 Scoping and profiling

As shown earlier, environmental and social impact assessment was employed as a tool in the construction of the legislative framework. This chapter explores the theoretical framework of social and environmental impact assessment which provides some justification for the method and format taken by this thesis. This involves the processes of scoping and profiling. In this chapter, profiling refers to processes such as the identification of key issues, boundaries for the study and identification of areas of likely impact (Taylor, *et al.*, 2004, 63). To do this, the chapter pays particular attention to the role and purpose in which environmental impact assessment played within the developmental stages of the Channel Tunnel proposal. In addition, notes are provided about the guidelines constructed to govern EIA and SIA within the EU. As an accompaniment to this, discussion is presented about the problems associated with data collection.

The scoping section of this chapter refers to the process of analysing and identifying the social context and historical trends as relevant to the regions of interest (Taylor *et al.*, 2004, 67). This section of this chapter examines the social and environmental contexts of Nord-Pas de Calais, Folkestone and Sangatte. This is because these areas house the Channel Tunnel entranceways and Nord-Pas de Calais and Kent remain major axes where international passengers, goods flows and communications converge. The topic areas discussed throughout this section include landscape, 'traditional' industries, local government structures, landscape characteristics and historic buildings.

4.1 Social and Environmental Impact Assessment

The twentieth century marked the beginning of the rise in environmental consciousness (Sheail, 2002, 147). As the public became more concerned with the impact that developments were having on the environment, social pressure was put on the bodies driving development to be accountable for the adverse affects that came as a result of their ventures (Sheail, 2002, 147). One reaction to this pressure was to use social and environmental impact assessment as a tool that could help reduce and mitigate the concerns of various environmental groups, local government organisations and the general public.

The definitions of social and environmental impact assessment are diverse, yet there are common themes throughout the definitions provided by different writers. Social assessment can be defined as the process of examining the potential impacts on the daily lives of individuals and communities by assessing the consequences that a project or policy decision may bring (Burdge & Vanclay, 1995, 1). Environmental impact assessment can be defined as "a study of the probable changes in the various socioeconomic and biophysical characteristics of the environment which may result from proposed or impending actions" (Balbach *et al.*, 2001, 5).

Whether this study is referenced as being a social impact assessment or an environmental impact assessment, the implications are similar. The reason being, that all environmental impacts have social implications. That said, these 'professional terms' come to mean one and the same thing. When examining the environmental issues in some shape or form the social is recognised. For example, while dust at first appears to be an environmental impact, the main impact of this issue is concentrated on local residents. While initial identification of this issue may analyse how the waste materials were to be covered while they were transported, it is the concern towards the impact that this issue is having on the 'social' that drives the analysis (Taylor *et al.*, 2004, 67). In light of this, groups, environmental bodies, individuals and the general public are all representative of the 'social'.

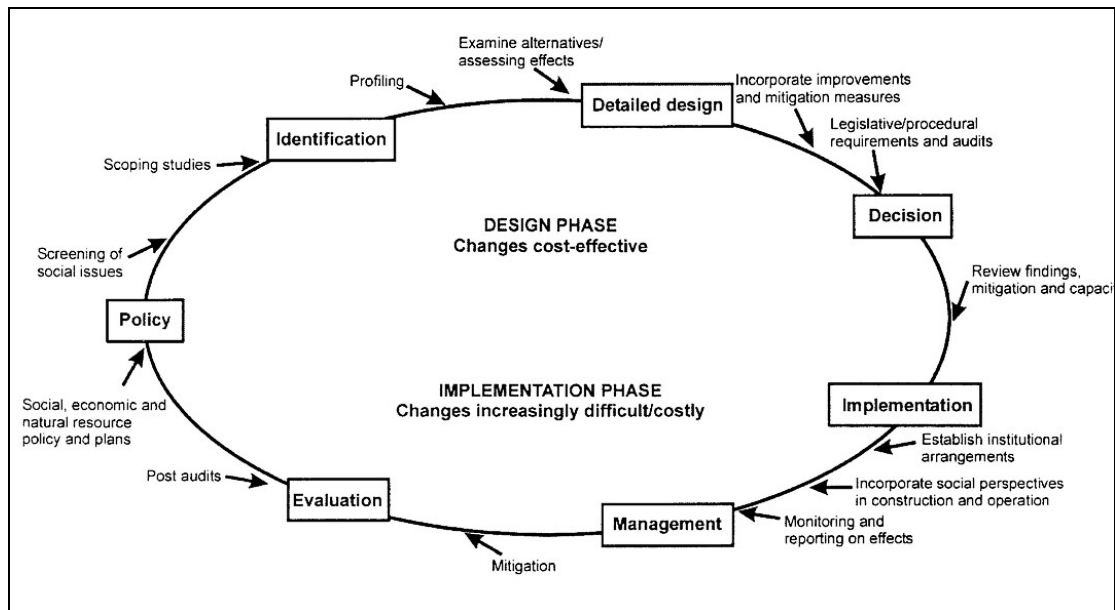
Social and environmental impact assessment procedures are now required as part of the development process in a large number of countries.

There has been a global push towards sustainable development. In accordance with this, interest has been shown towards measures that can be used to mitigate and manage environmental impacts. Social and environmental impact assessment is a tool used to help alert developers and governments about the adverse effects that come as a result of particular developments. Environmental assessments have been established as a:

technique and a process by which information about the environmental effects of a project [are] collated, both by the developer and from other sources, and taken into account by the planning authority in forming their own judgment on whether the development should go ahead (Goodenough & Page, 1994, 33).

Social and Environmental Impact Assessment encourages the bodies driving the development to act in a proactive rather than reactive manner. This is achieved through early issue identification which allows developers to adapt plans and implement strategies that will allow for these impacts to be effectively mitigated. Early impact identification enables proponents to design and implement effective mitigation strategies to ensure that the social and environmental 'costs' associated with developments are minimised while the positive benefits are able to be enhanced.

Figure 4.1.1 Social and Environmental Impact Assessment project cycle



Sourced from (Taylor *et al.*, 2004, 78).

The figure above illustrates components of the social impact assessment process. The stages in this process are clearly visible along with notes made relating to the activities that characteristically occur within each phase.

There is as yet no officially recognised unified form that governs the field of social and environmental assessment in Britain or France. For this reason EIA and SIA reports remain somewhat inconsistent. There are however, some general principles increasingly adhered to within this field. Currently “a fundamental measure of success of the appraisal is whether it is complete, adequate and an honest attempt to make a full disclosure of all the impacts” (Goodenough & Page, 1994, 46).

As time has progressed, social and environmental impact assessment has become an integral part of modern day development. Changes over the last decade have meant that EIA and SIA have become fundamental elements of development within the EU. In 1988 the Commission of the European Communities (CEC) brought the Directive on Environmental Impact Assessment into force (Balbach *et al.*, 2001, 233). In addition to this, in 1990 the EU created the European Environmental Agency (EEA) (Balbach *et al.*, 2001, 233). The main rationale behind establishing this organisation was to develop a universal environmental policy for the EU member states (Balbach *et al.*, 2001, 233). The Executive Director of the EEA declared that this agency is an EU institution that aims to serve the community and the member states with information to “support policy making for environmental protection put in the perspective of sustainable development” (Balbach *et al.*, 2001, 223). While the guidelines set out by the EEA are not obligatory, this organisation does provide guidelines for EU member states to refer to when constructing EIA or SIA and when examining environmental effects.

Figure 4.1.2 Annex IV of 1985 CEC Environmental Directive

TABLE 9.1 Annex IV of 1985 CEC Environmental Directive (as amended in 1997)
Description of the project*, including in particular: <ul style="list-style-type: none">• A description of the physical characteristics of the whole project and the land-use requirements during the construction and operational phases• A description of the main characteristics of the production processes, for instance, nature and the quality of the materials used• An estimate, by type and quality, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed project
An outline of the main alternative studied by the developer and an indication of the main reasons for his or her choice, taking into account the environmental effects.
A description of the aspects of the environment likely to be significantly affected by the proposed project, including, in particular, population, fauna, flora, soil, water, air, climate factors, material assets, including the architectural and archeological heritage, landscape, and the inter-relationship above the above factors. A description of the likely significant effects of the proposed project on the environment resulting from: <ul style="list-style-type: none">• The existence of the project• The use of natural resources• The emission of pollutants, the creation of nuisances and the elimination of waste, and the description by the developer of the forecasting methods used to assess the effects on the environment
A description of the measures envisaged to prevent, reduce, and where possible, offset any significant adverse effects on the environment.
A non-technical summary of the information provided under the above headings. An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.
This description should cover the direct effects and any indirect, secondary, cumulative short, medium, and long term, permanent and temporary, positive and negative effects of the project.

Sourced from (Balbach *et al.*, 2001, 234).

The framework above sets out the guidelines for effectively constructing an impact assessment as defined by the EU. While these points remain guidelines, this outline is a useful source of reference for what impact assessment should contain and address in order to be comprehensive and effective (Balbach *et al.*, 2001, 234).

At the time the Channel Tunnel was developed environmental and social awareness was a relatively new phenomenon in both Britain and France. In line with this, as illustrated throughout the body of this thesis, the methods employed to construct EIA and SIA were not governed by comprehensive guidelines as compared to the reports that would be required today.

4.2 Geographical layout of Nord-Pas de Calais and Kent

Kent is located on the south east corner of Britain between the Thames estuary and the Channel Tunnel⁶. It is the closest Kent county to the European continent. Kent has a population of over 1.33 million and the Kent County Council remains the largest county authority in Britain (Collier, 2001, 3). Kent's GDP per capita falls below the national average which currently sits at 97% of the EU15 average (Collier, 2001, 3).

Two internationally recognised landmarks that are symbolic to the Kent area are the Straits of Dover and the White Cliffs. This area was under continuous threat from invasion throughout the European wars. In addition to this, Kent remains a historic embarkation point for overseas travellers entering and leaving Britain. Dover is a seaport located in Kent. Folkestone is located about 8 miles South West of Dover (Dictionaries, 1). Shakespeare Cliff is situated northeast of Folkestone. There are currently three historic coasts located in South East Britain. One of these is Shakespeare Cliff. The road from Dover to Folkestone follows the sea around Shakespeare Cliff. These cliffs have emerged as being a natural wonder of the modern world. As the course of the Channel Tunnel ran beneath these cliffs they have gained an immense amount of international exposure.

Nord-Pas de Calais is the most northern region in France. The region extends from just south of Boulogne which is adjacent to Picardie, to its most northern point which meets the Belgian border neighbouring West-Vlaanderen and Hainault (European Commission, 1996, 30). Crévecœur and d'Armes are the two towns that make up Nord Pas de Calais (Eperon, 1991, 156). Nord-Pas de Calais has a population of approximately 4 million (Council, 2004, 4).

Historically this area was an industrial region that remained excessively dependent on a select range of abating industries (Bruyelle & Thomas, 1994, 91). In 1990, the last coal mine was closed and since this time vigorous regional development strategies have been developed in an attempt to offset the substantial job losses that had come as a result of the loss of traditional industries (Bruyelle & Thomas, 1994, 92). Although these strategies did promote new economic growth, particularly in the vehicle industry, unemployment continued to rise throughout the 1990s (Bruyelle & Thomas, 1994, 92). Nord-Pas de Calais, in a similar way to Kent, has a GDP per capita below the national average sitting at 80% of the current EU15 figure (Collier, 2001, 3).

From a geological perspective Nord-Pas de Calais is divided into three parts, these being the Artois hills in the west, the Lille basin in the east and the marshlands that run parallel to the Channel coast (European Commission, 1996, 30). The 'Métropole Nord', Lille-Roubaix-Tourcoing is the most densely populated area and the commercial hub of the Nord-Pas de Calais region (European Commission, 1996, 30). Sangatte is located west of Calais and is the site where the Channel Tunnel first reaches French soil. Slightly inland

⁶ See Map 1.2.1 in Chapter One.

from Sangatte in a wedge of country engulfed by steep walls of the chalk downs became the site where the majority of construction material was stored and transported throughout the making of the Channel Tunnel.

From an environmental perspective both Nord-Pas de Calais and Kent proved to be areas that were adequately resourced to allow for easy construction and operation of the Channel Tunnel. The primary reason for this can be attributed to the abundance of uninhabited land evident in and around these regions. Much of the British land needed for the Channel Tunnel is “protected landscape of attractive topography or of high agricultural quality” (Simmons, 1986, 15). On the French side, large land resources of flat land were available for construction purposes (Simmons, 1986, 15). Much of the land used for operating and constructing the Channel Tunnel was cultivated for agricultural purposes. This meant that the direct impact that the Channel Tunnel had on individuals was minimised. If the land used had been urbanised large numbers of people would have been directly affected. In line with this, these two regions possessed adequate amounts of uninhabited land that allowed for ease of construction of the Channel Tunnel.

4.3 The social contexts of Nord-Pas de Calais and Kent

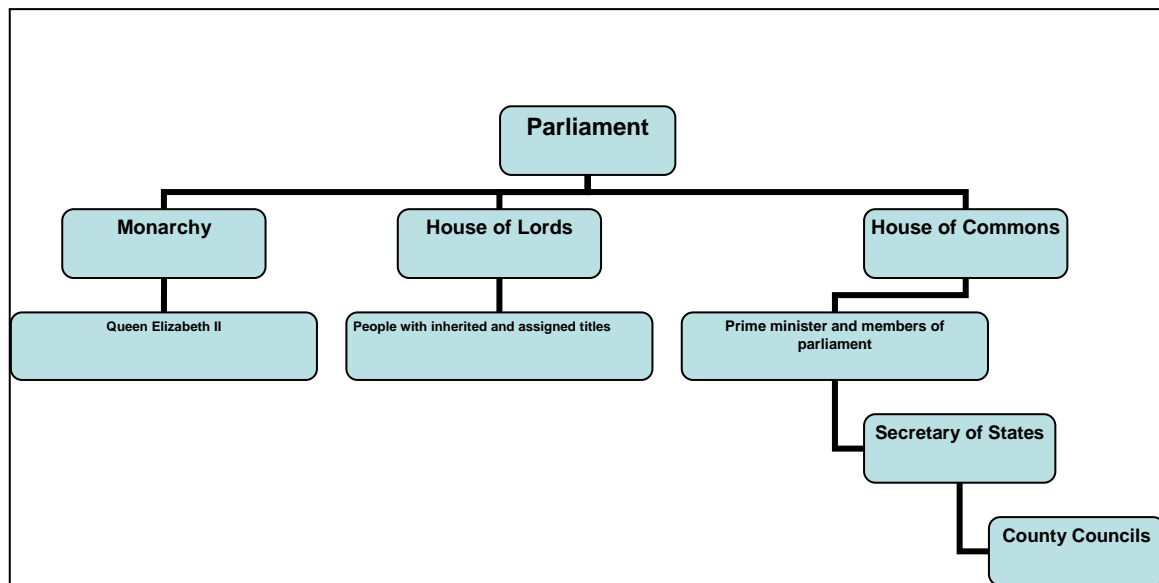
The English Channel which separates Kent from Nord-Pas de Calais remains a physical barrier that denotes both a cultural and linguistic barrier. Aside from the fact that both these regions exist in Europe, there are notable cultural differences apparent between the French and Kent. Aside from the linguistic barrier these areas have quite different governmental institutions and social characteristics.

In understanding the social contexts of both Nord-Pas de Calais and Kent, it is important to recognise the regional autonomy of both these regions. The Channel Tunnel is of primary concern to Nord-Pas de Calais and Kent. The social makeup of these regions will be “transformed, both directly or indirectly, as local and regional planning strategies seek to maximize the benefits which may be accrued from the Channel Tunnel project” (Bruyelle & Thomas, 1994, 87). Regional impacts of this development were influenced by their existing public policy structures. In addition the contrasting public policies and responses in the two regions have provoked divergent “public policy priorities and response to its short term impacts” (Collier, 2001, 3).

Within Britain regional bodies hold advisory roles to national government (European Commission, 1996, 51). In this sense they are able to pressure government bodies and local authorities. However, it must be noted that the decision making processes are conducted outside the realms of the regional arena. Kent’s location and size enables it to place a considerable amount of pressure on central government, while the smaller less influential regional authorities find it harder to pressure the bureaucratic machine. While Kent holds a considerable amount of power in contrast to other regional bodies, the decisions made that affect Kent are predominantly made from within the London metropolitan area, Kent’s northern neighbour.

Although France's governmental institutions are centrally organised, regional authorities have some power to self govern. Nord-Pas de Calais utilised this and developed a strong profile of "future orientated regional policy-making and planning" (European Commission, 1996, 51). Although this has given the region slightly more clout when it comes to influencing national government, Nord-Pas de Calais has not historically been an area of major interest for the French national government.

Figure 4.3.1 Outline of the structure of the British Government



Derived from (Wikipedia, 2005, 1)

The diagram above shows the basic hierarchy of the British government institutions. As apparent by this representation the national government holds supreme power in the governmental hierarchy⁷ (Wikipedia, 2005, 1).

Nord-Pas de Calais and Kent are seen to place a considerable amount of emphasis and recognition on their heritage. Both regions respect and celebrate the historic landmarks specific to their region. Appreciation of their historical landmarks meant that the impact on these movements was monitored under the watchful eye of local residents. Recognised attractions include bridges, castles, statues, churches and so forth.

4.4 The economic status of Nord-Pas de Calais and Kent

In the early 1900s the two major industries in Kent were agriculture and mining. Kent maintained an adequate level of economic buoyancy through its agriculture (Dictionaries, 1). The three major agricultural industries that occupy the landscape of Kent are orchards, hop-gardens and livestock. Kent is resourced with an abundance of fertile agricultural land. This attribute has resulted in Kent being promoted as "the garden of England" (European

⁷ See Appendix One for further explanation on the structure and role of the separate divisions of the British Parliament.

Commission, 1996, 30). Paper, brewing, pharmaceuticals and chemicals are other industries that make up the economic landscape of Kent.

While Kent is mainly a rural area, it also has a reasonably sized suburban culture. This suburban character comes because of Kent's close proximity to metropolitan London. The railway transportation system that links Kent and London has augmented the establishment and intensification of the suburban character currently identifiable within Kent. This has occurred because a large proportion of Kent's residents commute into the London area to work. In the 1980s, Kent's economy stagnated after the demise of a large number of coalmines. Industrial closures of this nature resulted in a number of job losses (Collier, 2001, 3). This decline was in part combated through transportation and communication restructuring which now prop up Kent's economy. Up until the early 1980s, Kent remained a relatively depressed region. In line with this, the idea of any infrastructure that would increase employment and inevitably fuel economic growth was welcomed warmly from an economic perspective (Holliday & Vickerman, 1989, 4). This is reiterated by the fact that economic projections associated with the Channel Tunnel remain a major focus of reports produced prior to the establishment of the Channel.

Except for the port activities in Dunkirk, Calais and Boulogne the vast majority of France's northern coastal region remains rural in character (European Commission, 1996, 26). Nord-Pas de Calais's economy is predominantly driven by old industry. Mining and business generated through ports remain the dominant industries of this region. Historically, this area was one of the major industrial centers in France with coal mining, steel and textiles all playing prominent roles.

Over the last two decades there has been major restructuring of industry. In line with this, the viability of industries such as textile and coal mining has dramatically declined. Nord-Pas de Calais has recently become a region focused on high-tech industries such as plant breeding, seed improvement, microcomputers, lasers, infrared technology, hygiene products, composite materials and surgical instruments (European Commission, 1996, 39).

Nord-Pas de Calais suffered a series of economic crises throughout the 1960s and 1970s. Calais almost universally welcomed the renewed interest in physically bridging the English Channel. This standpoint was fuelled by the need for economic revitalisation. Support for the Channel Tunnel was almost exclusively balanced on the ability of the developers to convince residents and local government bodies that financial benefits would accrue from the venture (Grayson, 1990, 6).

Both Nord-Pas de Calais and Kent act as gateways for entering and exiting Britain and Europe via the English Channel. These two regions are endowed with amenities in respect to railways, ferry ports and motorways (European Commission, 1996, 44). These facilities proved to be important resources for travellers, freight transferral, business people and so forth.

4.5 Conclusion

Increasing awareness of social and environmental issues put pressure on the bodies driving developments to be accountable for the impacts that would arise as a result of their ventures. Environmental impact assessment was recognised as a tool that could help developers manage and mitigate the issues at hand. SIA & EIA are iterative processes that allow for early issue identification which enables developers address the important issues in the beginning stages of the developmental process. The EU has established a framework to assist developers construct effective and consistent SIA & EIA reports.

Nord-Pas de Calais and Kent once relied on industries such as coal, mining and textiles. The demise of these industries towards the end of the nineteenth century forced these two areas into a period of economic uncertainty. As a result of this, the economic benefits projected to come as a result of the Channel Tunnel development were warmly welcomed by both these regions. Nord-Pas de Calais and Kent are socially, politically, economically and culturally diverse. Regional bodies in Britain hold advisory roles to national government while France's government institutions are more centrally organised. The main similarity between Nord-Pas de Calais and Kent is their landscape. Both regions have considerable amounts of uninhabited farmland. This resource proved to be useful for storing construction materials while it also allowed for the establishment of the Channel Tunnel terminals.

5.0 Alternatives

In the early 1980s various French and Kent community groups, business representatives and government officials voiced interest in establishing and selecting a structure to bridge the English Channel. This chapter identifies the project proposals submitted for the mandate to physically bridge the English Channel. The reasons behind the eventual decision are explained and the justification that the select committee gave for making their final decision is identified. In addition to this, geological considerations, financial imperatives and technical aspects of the proposal that was chosen are examined. Following this, the route options that were considered are explored. The reasons given for the selection of the chosen route are also provided as an accompaniment to this discussion. The design and construction components of the chosen structure are also documented. Graphical depictions are provided to give an accurate representation of the structure and form of the chosen design. The final section of this chapter presents a summary of the issues that were anticipated to be of importance in the venture that would physically bridge the English Channel.

5.1 Project options

In 1984, Prime Minister Margaret Thatcher and President Francois Mitterrand met to discuss the notion of building a fixed transportation link that would connect Britain and France (Grayson, 1990, 5). In April 1985, a joint working group of officials commissioned independent studies on the viability of designing a fixed transportation link to connect the two countries. (Grayson, 1990, 5). Proposals submitted for tender were to be received by 31 October 1985 (Wilson, 1991, 15).

A number of restrictions were placed on the tenders. The fixture had to be fixed, not floating and the engineering had to be robust (Kirkland, 1995, 2). Robust engineering in this context meant that developers had to illustrate that they would be using tried and tested technology and methods that were consistent with acceptable practice and international standards (Kirkland, 1995, 2). Any physical structure that would connect Britain and France would be a complex venture from both a development and engineering perspective. The technological, geographical and financial components of the project needed to be fully investigated and extensively understood by developers, government bodies and the financial backers. The sheer logistics and size of this venture meant that engineers, corporate bodies and developers had to think outside the square to produce viable transportation link alternatives.

The tender process was opened to the public. There were however, no financial resources made available to help with the research and production costs of developing a viable proposal. The proposals submitted had to meet the interests of the governments and specialists involved in the consultation process. In accordance with this, the contending proposals for the mandate to build the Channel Tunnel were in some senses constrained. The main objective of a fixed transportation link was to facilitate travel and cargo distribution between the two countries. Once these prerequisites were

satisfied, the proposal then had to be financially viable. In addition, the proposals sought to satisfy the interests of the selection committee. This committee consisted of government officials, transportation experts and public consultants from within Britain and France (Grayson, 1990, 5). These measures were by no means easy to satisfy. The assortment of tenders submitted by individual companies emphasises the dynamic nature of this exercise. The range of alternatives were extensive, the means of construction varied and each proposal was a pioneer in comparison to projects of a similar nature previously developed.

Ten proposals were received but after official consultation by the selection committee a short list was established which comprised of contenders to be further scrutinised (Grayson, 1990, 5). The four proposals contrasted greatly and varied in design, cost and mode of transport. Four private entities were responsible for the submissions. In deliberations over the applications, the entities that had submitted proposals were scrutinised along with the viability of the proposals themselves.

The four submissions that were short listed were as follows:

A) The Channel Expressway application was tendered for by Sealink UK which remains a subsidiary of British Ferries (Hunt, 1994, 173). This scheme proposed “two road/rail tunnels, each 11 metres (36 feet) in diameter, with a single rail track running down the centre of each tunnel” (Hunt, 1994, 173). The single rail track was to allow one train per hour in each direction. The cost was estimated to be around £2.6 billion (Grayson, 1990, 5).

B) Channel Tunnel Group- Franche-Manche (CTG-FM) submitted a proposal that consisted of a “two single track bored tunnel for through and shuttle services together with a linked service tunnel” (Grayson, 1990, 5). The 2,500 page report projected that the tunnel would come at a cost of £2.6 billion (Grayson, 1990, 5).

C) Eurobridge’s proposal consisted of independent road and rail links. They suggested “a four-deck bridge with spans 5km long plus a single track bored tunnel for BR/SNCF⁸ through service” (Grayson, 1990, 5). The rail link would be operated through a single bored tunnel while the road link design suggested a series of suspended bridges that were enclosed in a tube (Kirkland, 1995, 5). At £5.3 billion this was the most expensive application submitted (Grayson, 1990, 5).

D) Euroroute was the fourth tender in the short listed group. This proposal included a road and rail link (Kirkland, 1995, 5). The rail link arrangement was designed in two bored single track tunnels (Kirkland, 1995, 5). The road design comprised two artificial islands at “the edges of the main shipping lanes joined to shore by bridges and to each other by an immersed tube

⁸ BR/SNCF stands for British Rail and the Société Nationale des Chemins de Fer Français. In 1978, this group started planning a single track rail tunnel that was specifically designed for through rail services. This became known as the “Molehouse” proposal when plans were put forward to government officials in 1979. (Grayson, 1990, 5).

tunnel” (Grayson, 1990, 5). In addition, two track bored tunnels designed for through services of BR/SNCF were part of the proposal. It was anticipated that this venture would come at a cost of around £5 billion (Grayson, 1990, 5).

Each contender had invested a considerable amount of time, energy and financial resources into their proposal. As a result of this, they all possessed a healthy interest in acquiring the contract to build the fixed transportation link. Because of the large amount of resources that were invested in the proposals, each entity put a substantial amount of energy into making sure that the selection committee was aware of their proposal’s merits.

The schemes presented were scrutinised by a team of specialists. This group consisted of senior representative officials from both governments, the House of Commons Transport Committee and British Land Use Consultants (Grayson, 1990, 5). On 1 November 1985, the Transport Secretary Nicolas Ridley spoke in the House of Commons after receiving the proposals (Anderson & Roskow, 1994, 30). He stated, “Today is a very important day in the long saga of whether there should be a fixed link between Britain and France. The most important requirement is that whatever link may be chosen, it must be capable of being financed without any support from local government funds or government guarantees against commercial or technical risks” (Anderson & Roskow, 1994, 30). Deliberations commenced and the remaining four proposals were considered against the conditions that had been outlined when the contract had been initially put up for tender. Discussion points important to each proposal were as follows:

A) The Channel Expressway was a main contender for the contract, although officials felt that this venture might cost more than the proposal predicted. In addition, it was thought that there would be some engineering challenges associated with establishing a road tunnel. This is because road tunnels involve much larger bore holes than rail tunnels and this can present serious engineering problems and require costly solutions (Anderson & Roskow, 1994, 34). Officials also questioned how people would cope with driving through a tunnel for a prolonged period. Overseas research suggested that drivers travelling through tunnels for extended periods “have trouble keeping to lanes” (Anderson & Roskow, 1994, 34). In line with this, there were concerns that a tunnel of this nature may result in large numbers of casualties. In addition, ventilation mechanisms for extracting exhaust fumes were a concern. The proposal submitted was not comprehensive enough to dispel concerns about exhaust fume extraction.

B) Channel Tunnel Group- Franche-Manche produced a well researched proposal. CTG-FM was made up of sixteen separate entities these being five British contractors, three British banks, five French contractors and three French banks (Neerhout, 2001, 5). This consortium had acquired a reasonable amount of financial support. Japanese banking institutions had expressed an interest and prior to the mandate being announced. CTG- FM had received over £4 billion of provisional loan commitments (Anderson & Roskow, 1994, 26). As the international banking community was seen to support this venture CTG-FM was a step ahead of their competitors. The

technological aspects of this form of development were tried and tested. It was an unpretentious, technologically sound, functional proposal that was backed by many from the outset.

C) Although Eurobridge had mustered support from some reputable bankers, the viability of this project was questionable from the beginning. The primary reason for this was technological concerns. The selection committee had strong doubts as to whether bridge technology had advanced far enough for such a project. The bridge spans were 5km long which was over three times the length of the Humber Bridge which still remains one of the longest bridges in the world (Anderson & Roskow, 1994, 31).

D) EuroRoute sought to open a rail link 18 months after the completion of the road link (Anderson & Roskow, 1994, 31). This proposal was later modified so that the rail and road links would be opened at the same time (Anderson & Roskow, 1994, 31). In addition, financial commitments to this project were unstable and there were some technological concerns about the project's overall design. EuroRoute with its bridge/tunnel scheme was at one point seen to be a favourable option. The primary reason for this was that Prime Minister Thatcher was known to have preferred this tender "as it could not be threatened by rail unions and because most motorists would probably prefer a straight drive across" (Wilson, 1991, 15).

After a short period, two major contenders emerged. The race to win the mandate to design, build and run the fixed transportation link came down to CTG-FM and the scheme dubbed EuroBridge. Later discussions suggested that EuroBridge was never a real threat to CTG-FM due to the financial and technological concerns associated with the building of such an enormous bridge. In December 1985, the French and British governments made a joint announcement (Grayson, 1990, 5). The winner was the tunnel/shuttle scheme that had been submitted by the consortium Channel Tunnel Group- France-Mache SA (CTG- FM). In the time following, the consortium responsible for constructing and operating the Channel Tunnel came to be dubbed Eurotunnel. The Eurotunnel stamp is now the internationally recognised name for the consortium that developed, and currently owns and operates the Channel Tunnel.

In early 1986 Prime Minister Thatcher and President Francois Mitterrand met and made a joint announcement confirming that CTG-FM had been awarded the mandate "for the development, construction and operation of a fixed link across the English Channel" (Hunt, 1994, 178). Mitterrand remarked at the event enthusiastically that "France is delighted to bear witness to the fact that, when one has the will, it is always possible to unite people who are already drawn together by so many things..." (Hunt, 1994, 178). Prime Minister Thatcher marked the event with a somewhat more pragmatic response proclaiming that "We have made the right choice and passed a fundamental stage in the co-operation between the UK and France...the project is not the last word, it is the first step. It will be judged a thrilling undertaking" (Hunt, 1994, 178). The consortium of experts that had deliberated over the submitted proposals released information outlining the reasons for preferring the

tunnel/shuttle scheme. There were a number of reasons given for the decision to adopt the CTG-FM scheme. They can be summarised as shown below.

1. Financially, it was the most sound
2. It carried the minimum amount of technological risks
3. It was viewed to be the safest alternative for passengers
4. Maritime problems were rendered invisible
5. It was seen to be the least vulnerable to terrorist threats and sabotage
6. Experts anticipated that the environmental impacts associated with this proposal could be adequately contained (Hunt, 1994, 179).

From both an engineering and financial perspective this development was an unprecedented venture. This project had to be exclusively funded through the private sector. As a result of both governments' reiterating that this venture had to be privately funded, financial imperatives become an increasingly important facet. The financial backing obtained for Eurotunnel's scheme was an important factor that enhanced the viability of the Channel Tunnel proposal.

In addition to these factors, a number of other aspects played a role in the final decision of choosing Eurotunnel's scheme. Back in 1857, Gamond had done extensive investigation into the viability of an underground tunnel that ran beneath the English Channel. During his explorations he discovered that "the chalk measures underlying Kent and Nord/Pas de Calais also lay beneath the sea bed" (Neerhout, 2001, 38). Later geological studies exposed that the chalk measures merged with clay forming almost a uniform stratum of chalk marl. This stratum began only 40 metres below the seabed of the English Channel (Neerhout, 2001, 38). Throughout the geological world it is a commonly known fact that chalk marl is one of the best tunnelling mediums. The existence of this natural resource meant that a tunnel, according to geologists was a sound and viable option.

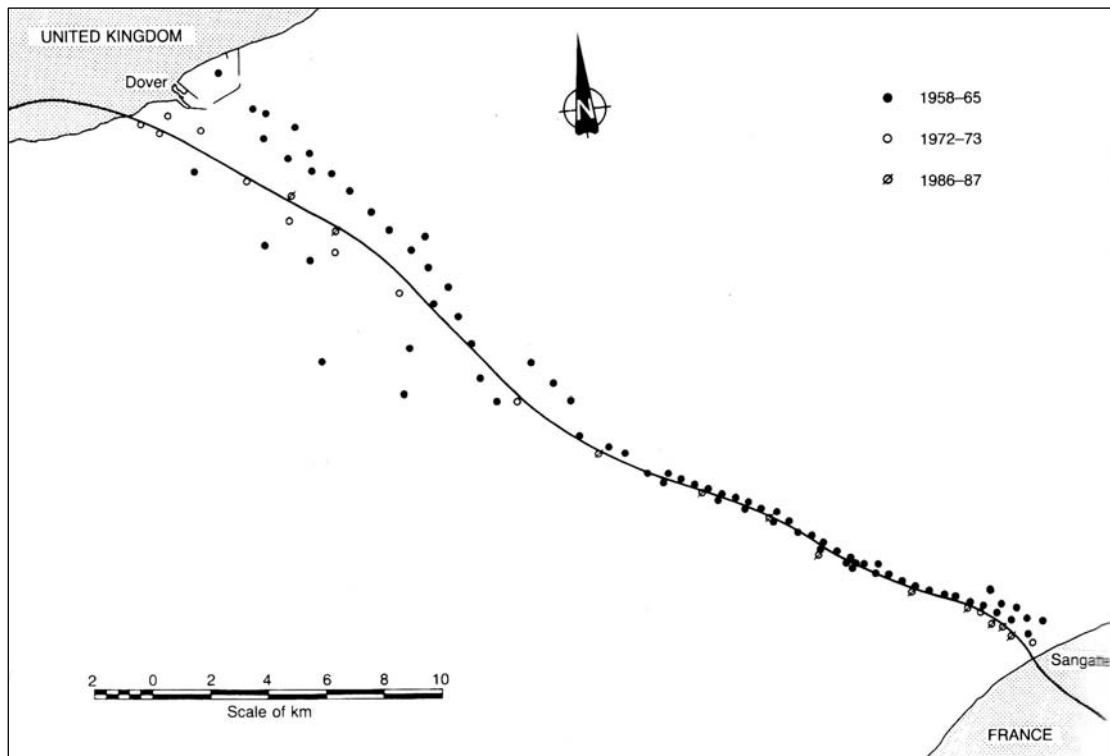
Along with support from the geological community there were other institutions and factors that sanctioned the development of a tunnel. It was widely acknowledged that the English Channel is an incredibly busy seaway that carries over 600 ships each day (Neerhout, 2001, 38). Any structure that was constructed over the English Channel would in due course be hazardous to ships crossing the strait. The treacherous conditions provide enough challenges for sailors but adding a fixed structure into the mix would have inevitably been at some point a deadly hazard for shipping. Environmental considerations also sanctioned the viability of this specific development. The fact that that CTG- FM proposed that the tunnel would run entirely underground meant that the link would not interfere with the marine environment (Eurotunnel, 2003, 5). In light of all this, the decision was made and the English Channel that had divided two nations since the last ice age was going to be bridged by a fixed transportation link.

5.2 Tunnel route options

Once Eurotunnel had been given the mandate to design, build and operate the Channel Tunnel, the next question was what route this structure would take across the English Channel. One of the significant factors that had facilitated the decision to build the Channel Tunnel was that the rock that lay beneath the English Channel was ideal for tunnelling. The logistical demands of construction and use of a marine tunnel increase as the length of a tunnel increases. In light of this, the initial proposal for the Channel Tunnel was to cross the Strait of Dover. This was primarily because this section of water crosses the narrowest corridor of sea that separates France and Britain. This corridor spans at its most southern point from Folkestone to Cap Blanc-Nez to the North from St Margaret's Bay to Sangatte (Darby *et al.*, 1992, 43). Naturally the shortest route across the English Channel would have been the favoured route, yet geology ultimately decided what route would be chosen.

As mentioned earlier Gamond did exploratory work on the seabed during the 1880s. It was his work that first advocated the route from Shakespeare Cliff to Sangatte. Drawing on the work done by Gamond, developers in the 1990s sought to gain a more extensive understanding of the geological makeup of the ocean bed. In investigating this, geologists took samples from the sea-bed off jack up platforms which worked rather like miniature oil rigs (Wilson, 1991, 39). The main objective of this form of exploration was to determine how the different sediments would react to drilling. This in turn allowed geologists to detect faults and fissures in the sea bed. Evidence collected confirmed that the chalk cliffs that run along the banks of the English Channel also continue throughout the Strait of Dover and these chalk cliffs appeared to contain no major faults (Kirkland, 1995, 21). In addition, it was found that chalk marl formed the lower third of the chalk layer that lay under English Channel and had a clay content of between 30 and 40% (Kirkland, 1995, 21).

Figure 5.2.1 Borehole testing

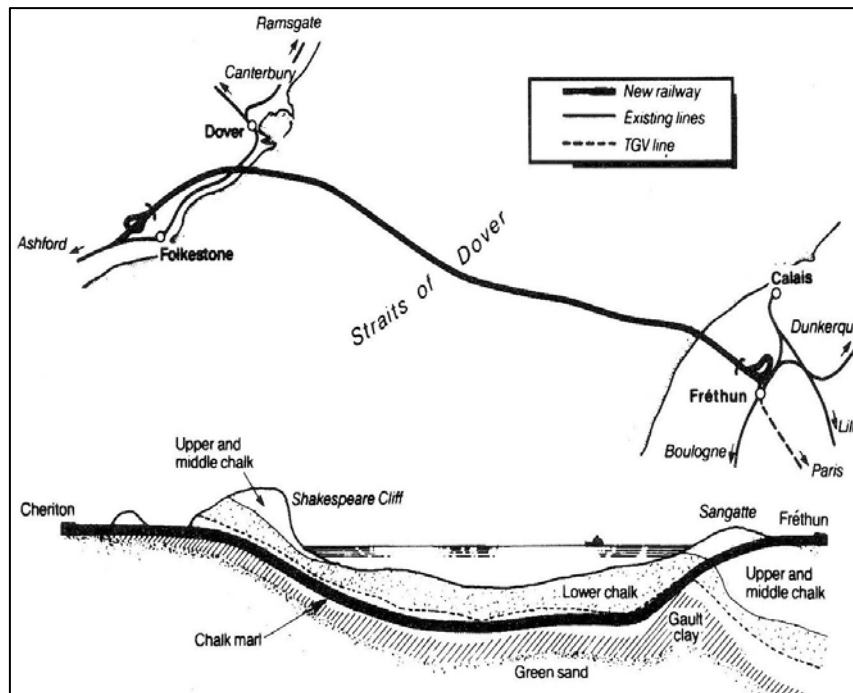


Sourced from (Kirkland, 1995, 23).

The picture above illustrates the borehole tests carried out under the English Channel. A significant proportion of these tests were done during historical attempts to bridge the English Channel (Kirkland, 1995, 23).

Middle chalk is poor material for boring through (Wilson, 1991, 39). Beneath this lies lower chalk which comprises of a mixture of chalk and clay (Wilson, 1991, 39). This rock consists of “cyclic alternations of grey marly chalk with stronger limestone bands” (Darby *et al.*, 1992, 43). Lower Chalk is an adequate medium to bore through and geological studies illustrate that the qualities possessed by chalk marl proves to be superior for this form of excavation. This substance is a strong, slightly plastic soil that rarely fractures. Another important attribute of chalk marl is that it is impervious (Eurotunnel, 1994, 26). Impervious implies that this substance is essentially waterproof. Recognising this, engineers decided to follow the chalk marl through the ocean floor. Chalk marl undulates through the sea bed and as a result the Channel Tunnel also had to do so.

Figure 5.2.2 Layout and geological composition



Sourced from (Biggart *et al.*, 1992, 57).

This graphical representation illustrates the geological composition of the English Channel seabed. This picture also demonstrates the line that the Channel Tunnel was designed to take through the seabed from Sangatte to Shakespeare Cliff (Biggart *et al.*, 1992, 57).

The route selected spans from the Folkestone terminal at Cheriton to the terminal at Coquelles, which is near Nord-Pas de Calais (Hunt, 1994, 184). The Cheriton terminal is located near Folkestone in Kent and the Coquelles terminal is close to the French village of Fréthun in Nord-de-Calais (Neerhout, 2001, 7). The French terminal covers 1,186 acres of land while the Kent terminal covers 346 acres of land (Neerhout, 2001, 7). The main reason for the variation in surface coverage is that the British terminal was geologically constrained which resulted in considerably more land being destroyed in France. In turn with this, the environmental impacts associated with land excavation were more apparent in France than Britain.

The Channel Tunnel would run on average 45 metres below the seabed (Kirkland, 1995, 13). The route that was eventually decided upon dived into the seabed at Sangatte in France and travelled underground until Shakespeare Cliff in Britain, where it tracked inland until it reached Folkestone terminal (Jensen, 3). The Channel Tunnel travels for 23.6 miles under the seabed and is 31.35 miles long (Jensen, 4). Overall, the route forms a 'w' shape with the highest points being at the two entrances where the Channel Tunnel connects with land.

5.3 Design and construction components of the chosen proposal

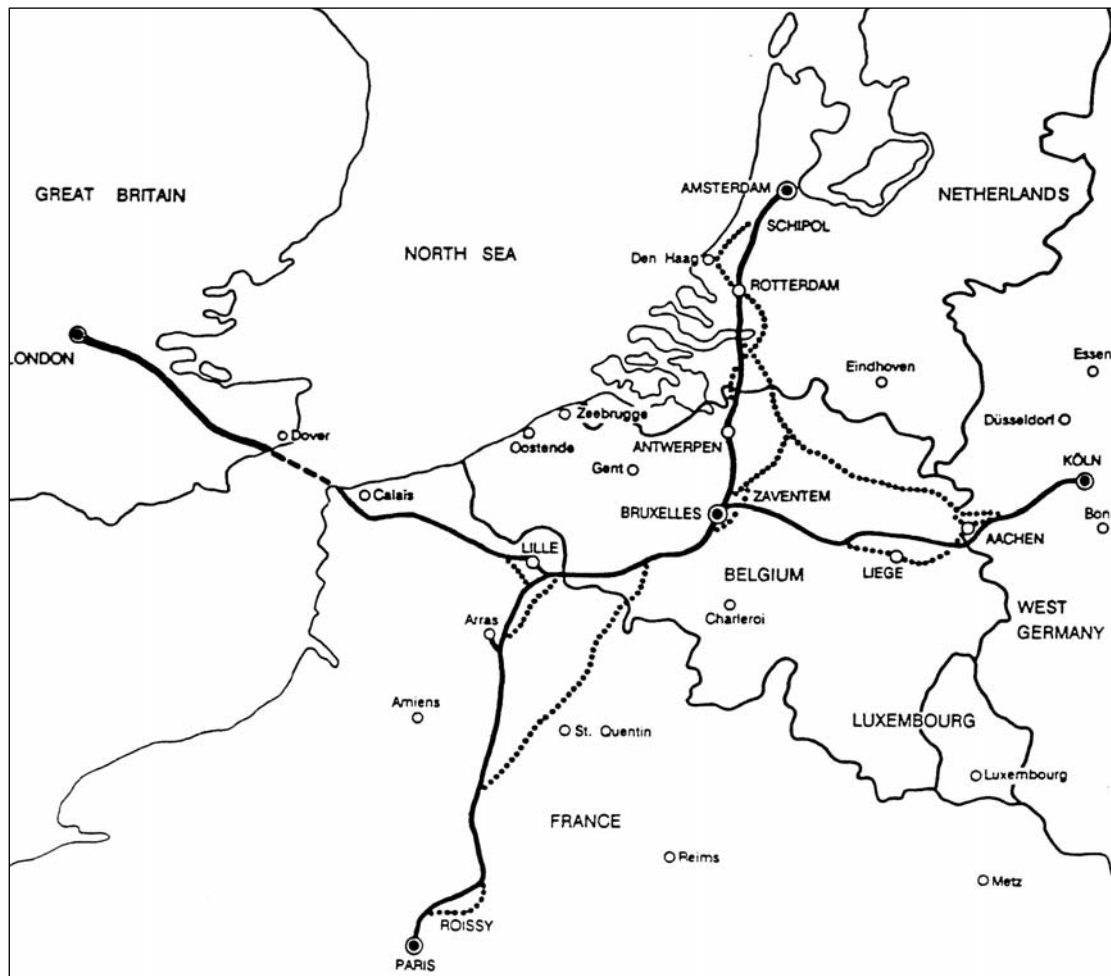
The scheme Eurotunnel submitted to tender of the contract to build a fixed transportation link between Britain and France was a complex proposal. In order to understand the issues that arose from this particular proposal it is important that the proposal itself is extensively examined.

CTG- FM decided that the Channel Tunnel would be drilled by tunnel boring machines. Tunnel boring machines are “mobile excavation factories that combine drilling, material removal, and the process of shoring up the soft and permeable tunnel walls with a concrete liner” (Dictionaries, 1). Tunnel boring machines look like huge cylinders and extend up to the length of two football fields (Jensen, 4). They have massive “wheel wields tungsten teeth” that chew through chalk at an average rate of 15 metres per hour (Jensen, 4). The soil excavated by these machines was to be extracted via conveyor belts which would be located behind the machines. The logistics of digging two tunnels over 30 metres apart in alignment with one another are profound. It was essential that Eurotunnel ensured that the tunnels intersected at the same point. Providing the machines met within 250 centimetres of themselves they could be bridged (Jensen, 5). It would have been disastrous for Eurotunnel if the passageways were off course by over a radius of themselves (Jensen, 5). In accordance with these concerns, radar waves and conceptualised laser guidance systems were to be employed as mechanisms to ensure that the two boring machines remained on track.

Although, geological tests proved that the seabed contained chalk marl which provides favourable for tunnelling there were some challenges associated with the tunnelling of the Channel Tunnel. Firstly, the length of Channel Tunnel to be excavated was in excess of 20km longer than any tunnel previous excavated (Dictionaries, 3). Secondly, in order to meet the construction programme requirements an extremely high rate of advance was required (Dictionaries, 3). In addition, as with any venture of this nature there are often geological complications. Surveying cannot provide absolutely comprehensive findings thus there was always the possibility of tunnelling into unexpected ground conditions (Dictionaries, 3).

The CTG- FM proposal was a rail transport scheme that would directly link the UK rail networks with those in and around continental Europe (Biggart *et al.*, 1992, 18). One major component of this scheme was that it would link the existing transportation schemes in Britain and France with one another. This development was an essential component in the idea of connecting Europe’s high speed railway infrastructures with those in the United Kingdom.

Figure 5.3.1 Proposed European high speed fixed transportation network



Sourced from (Biggart *et al.*, 1992,).

The picture above shows a graphical depiction of the idea of establishing a high speed fixed transportation link in and around the United Kingdom and Europe. The Channel Tunnel proves to be an important link in this initiative (Biggart *et al.*, 1992,).

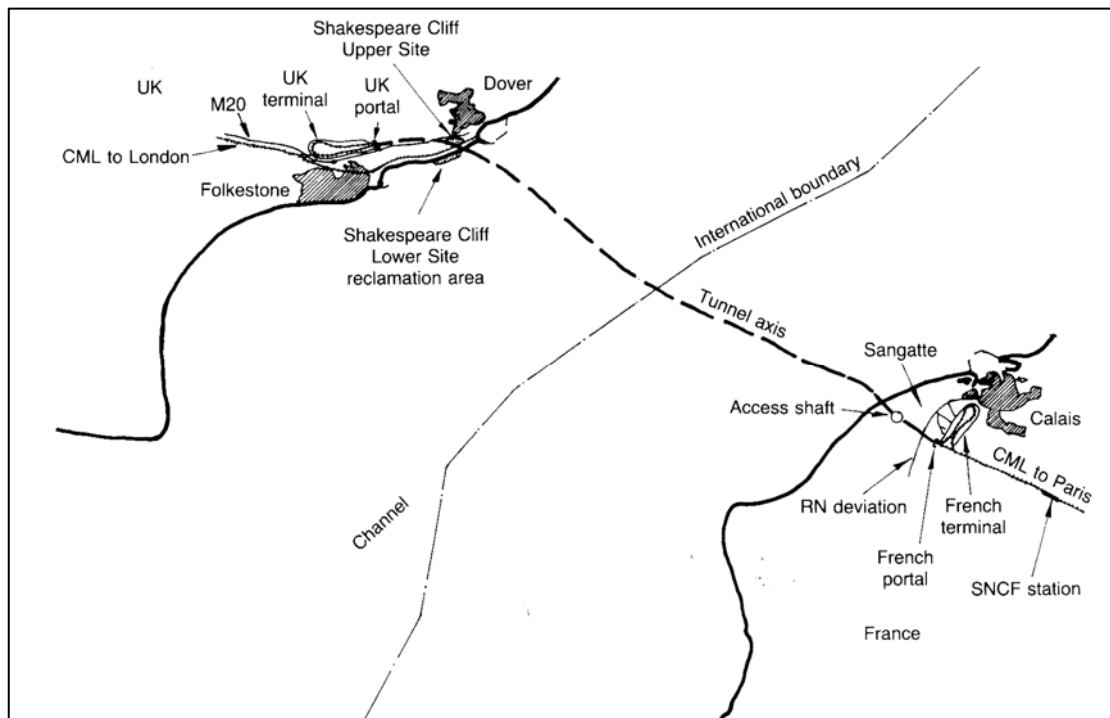
From a design perspective there were a number of interesting elements apparent within Eurotunnel's design. These were: main tunnels, cross passage and equipment, pressure relief ducts, pumping stations, crossovers and tunnel drives (Biggart *et al.*, 1992, 18). The Channel Tunnel proposal consisted of three 59km tunnels that ran parallel to one another (Kirkland, 1995, 13). These tunnels were lined with "pre-cast concrete segmented rings, except for areas of poor ground or at tunnel connections or intersections, where ductile iron linings were used" (Neerhout, 2001, 7). Tunnels are often lined with ductile iron although in the case of Channel Tunnel particular care was taken to ensure that the materials used were of the highest quality. To decide on the materials and design of the tunnel lining 18 development studies were carried out by CTG- FM (Neerhout, 2001, 7). The materials used have 120 year longevity meaning that the Channel Tunnel structure should not encounter any significant deterioration before the year 2114.

Two main tunnels were designed in the plans. Each tunnel held a “single rail track, and a separate service tunnel lying midway between the running tunnels and connecting them by cross-passages” (Biggart *et al.*, 1992, 18). The rail tunnels transport trains in one direction. The trains do not reverse but rather change direction by travelling around loop systems situated at the Folkestone and Coquelles terminals. The main motivation behind developing two separate rail tracks was to minimise construction risks and to ensure that the environment established would allow for easy long term operation and maintenance. These two main tunnels were designed to carry trains North and South while the third smaller tunnel was intended to serve as an access tunnel to allow for maintenance (Dictionaries, 2). The primary function of the service tunnel was to “provide access to and from the running tunnels throughout their length in both normal and emergency conditions, and it allows the tunnels to be evacuated within 90 minutes” following any emergency halting of trains (Biggart *et al.*, 1992, 19).

Every 375 metres, the two main tunnels and the service tunnel are connected by cross passages that are used for service, ventilation, emergencies and maintenance (Kirkland, 1995, 14). The crossovers connect the main tunnels and service tunnel while they also house equipment such as transformers, switchgear and signalling equipment (Biggart *et al.*, 1992, 19).

Pressure relief ducts are an essential part of any underground tunnel system. The main tunnels are joined every 250 metres by pressure relief ducts which allow for the exchange of air (Kirkland, 1995, 14). Air pressure and aerodynamic resistance increases as trains travel long distances through enclosed structures. In line with this, without pressure relief ducts, the power needed to fuel a train dramatically increases which means that the train will become inefficient from a resource perspective. The design proposed that five pumping stations would be assembled along the tunnel structure. Maintenance and operational requirements meant that four double crossovers needed to be incorporated “between the two terminals to allow trains to cross from one running track to the other; two crossovers lie close to the two terminals; the other two lie under the sea and divide the tunnel length into three approximately equal sections” (Biggart *et al.*, 1992,19).

Figure 5.3.2 Layout of the Channel Tunnel development



Sourced from (Biggart *et al.*, 1992, 19).

Figure 5.3.2 provides a basic illustration of the layout of the Channel Tunnel project. Sangatte and Shakespeare Cliff were the two major construction sites needed for this venture. As both areas were rural they proved to be well suited for construction and operation purposes.

Special trains were needed to transport cargo and passengers through the Channel Tunnel. Ordinary locomotives posed a variety of concerns for developers. In light of this, Le Shuttle and Eurostar trains were the trains chosen to operate in the Channel Tunnel (Jensen, 6). Le Shuttle trains transport passengers, cars, vans, goods vehicles and cargo in specially designed shuttle wagons (Kirkland, 1995, 14). Eurostar accommodates automobiles and passengers crossing the English Channel. The main concern with ordinary diesel locomotives is that they would emit too much pollution into the tunnel passageways. The benefit of Le Shuttle and Eurostar is that both trains are electronically propelled. They are also sculptured in an aerodynamic manner which helps to reduce air friction and minimise the temperature within the Channel Tunnel.

5.4 Issues specific to the chosen transportation route

In examining what route the Channel Tunnel should take, decision makers had to identify the issues specific to each viable route. It was inevitable that with a development such as this numerous social and environmental issues would arise as a consequence of both the establishment and operation of the Channel Tunnel. While some impacts would only exist in the short term, others would have a long term impact on society and the surrounding

environment. These issues will be further examined in the following sections of this report but for now it is essential that they are recognised. They are as follows:

- A) Construction; the volume of materials and machinery needed was immense. Developers needed to ensure that both Sangatte and Shakespeare Cliff had the space to store and leave equipment needed for digging and constructing the Channel Tunnel.
- B) Economic implications on communities at Sangatte and Shakespeare Cliff; the economic implications on these two areas would be substantial. This impact was split into three distinct categories, these being; employment; tourism and manufacturing; and other service industries (The Royal Town Planning Institute, 1990, 24).
- C) Wider economic implications for the two countries; it is inevitable that a link such as this would have a huge impact on aspects of the economies within France and Britain. While this seems obvious, it was important that developers were able to substantiate that the economic benefits of this structure would outweigh the economic downfalls.
- D) Environmental implications on marine life and the natural habitat of the two areas because of construction and the long term operation of the Channel Tunnel; the environmental implications associated with the development of the Channel Tunnel are large. While disruption to land was unavoidable, developers needed to ensure that measures to mitigate and manage these impacts were identified and implemented.
- E) The political implications; it was inevitable that this venture would have some impact on the political climate in Europe. While it was unlikely that it would result in hostility between European nations, it was important that developers recognised that the Channel Tunnel would have some impact on the political arena.

5.5 Conclusion

There were a number of project proposals submitted in an attempt to win the mandate to physically bridge the English Channel. Euroroute's road and rail link, Eurobridge's deck bridge, Channel Tunnel Group- Franche-Manche's (CTG- FM) two single track bored tunnel and Channel Expressway's Sealink were the final four proposals scrutinised by the selection committee. The Channel Tunnel Group- Franche-Manche's (CTG- FM) tunnel design was eventually awarded this mandate. The reasons given in favor of this scheme included:

1. Financially it was the most sound
2. It carried the minimum amount of technological risks
3. It was viewed to be the safest alternative for passengers
4. Maritime problems were rendered invisible
5. It was seen to be the least vulnerable to terrorist threats and sabotage
6. Experts anticipated that the environmental impacts associated with this proposal could be adequately contained.

Geological considerations, land resources and population issues were also components of the Channel Tunnel proposal viewed favourably by the selection committee. It was decided that this structure would cross the English Channel reaching Britain at Folkestone and France at Sangatte. These two areas in turn came to house the two Channel Tunnel entranceways. Two main tunnels, cross passage and equipment, pressure relief ducts, pumping stations, crossovers and tunnel drives were the important design components of Eurotunnel's proposal.

Political implications, economic impacts on Nord-Pas de Calais and Kent, economic implications for the European Union, construction disturbance and environmental issues were all identified as impacts that would be central to the development of this particular scheme. These impacts become central discussion points throughout the remainder of this thesis.

6.0 Development and construction Issues

Construction on the Channel Tunnel began in 1986 and by 1994 the facility was ready to begin operations. A number of significant issues came out of the construction phase of this development. This chapter identifies why and how Eurotunnel made an attempt to manage and mitigate the issues that arose during the construction of the Channel Tunnel. Following this, the methodologies that were used to evaluate the impacts of the venture are discussed. Notes are provided on the role that public opposition played in the development and construction phases of this development. The positive impacts that came as a result of this development are also outlined.

The nature of the complaints voiced by local residents during the construction phase of the Channel Tunnel is a significant discussed point of this chapter. The issues surrounding temporary and permanent land acquisition are shown and particular attention is paid to how this issue was legislated for in the Channel Tunnel Act. Soil disposal and noise pollution are two issues that occurred as a result of the construction of the Channel Tunnel are discussed throughout this chapter. In addition, soil transportation and the impact that this issue had on local residents are explored. The impacts that these issues had on the social contexts of Nord-Pas de Calais and Kent is demonstrated in relation to all of the issues identified. Furthermore, the mitigation methods Eurotunnel employed in an attempt to mitigate the affects of these issues are discussed. The final part of this chapter provides a summary on Eurotunnel's performance.

6.1 Eurotunnel's role and assessment of impacts

Worldwide interest in the Channel Tunnel can in part be attributed to the development size, logistical demands, engineering requirements, geological considerations, financial imperatives, legislative framework as well as the political arena in which this development was conducted within. All these aspects influenced what issues arose as a result of the Channel Tunnel development and the methods that were used to mitigate these issues. The manner in which the environmental and social impacts were addressed and mitigated have made the Channel Tunnel development a pioneering project of its time for Britain and France.

From the outset Eurotunnel openly pledged that environmental considerations would remain a focus throughout the development and the operation of the Channel Tunnel. In accordance with statutory requirements, Eurotunnel has had to produce environmental reports that examine the immediate and long term impacts that have come to be associated with the construction and operation of this piece of infrastructure (Goodenough & Page, 1994, 26). The contractor was required to "design and construct the works to reduce and, where practical, to avoid all harmful effects on the environment and inconvenience to local communities as a consequence of the design, construction, commissioning and maintenance of the works" (Kershaw & McCulloch, 1993, 22). Additional notes were made about how to appropriately manage 'noise, dust and other emissions, disposal of liquid and solid waste,

protection of water bodies and remedial measures for any uncontrolled emissions” (Kershaw & McCulloch, 1993, 22).

It is essential that the methodology that was used to evaluate these impacts is noted. Data were collected from regulatory bodies and interest groups and used in conjunction with existing information about the landscape (Goodenough & Page, 1994, 42). This data was collated, analysed and scores were allocated to visual and landscape impacts along with the source of the impacts themselves (Goodenough & Page, 1994, 42). The scores acted as a guide for developers allowing them to identify significant issues early on in the developmental phase. Micro survey reports were also conducted. (Goodenough & Page, 1994, 42). The primary motivation behind these reports was to allow for the development of effective mitigation proposals (Goodenough & Page, 1994, 42).

Photomontage techniques were used to help developers understand the level of effectiveness of different mitigation strategies for various impacts (Goodenough & Page, 1994, 42). This form of analysis is a relatively unbiased, environmental tool, which helps to give a visualisation of future environmental conditions (Goodenough & Page, 1994, 42). Although the examination of landscape and visual impacts is inevitably somewhat subjective, this form of technique helps ensure that landscape and visual impacts are recognised throughout the development phase.

It was unavoidable that this particular development would come at a considerable cost to the social and environmental contexts of Nord-Pas de Calais and Kent. In accordance with the governing legislation Eurotunnel was required to project, identify and address the issues at hand. This is illustrated by the fact that Eurotunnel formalised its environmental management strategies by establishing the Environmental Management System (EMS): an organisation created to ensure continuing improvements in Eurotunnel’s environmental performance and to help control the actual and projected impacts that would come as a result of the Channel Tunnel venture (Eurotunnel, 2002, 3). The main objectives of Eurotunnel’s environmental policy were to:

- continually improve their environmental management
- maintain regulatory compliance
- prevent pollution
- voluntarily communicate with the public (Eurotunnel, 2003a, 9).

6.2 Public opinion

As a background to understanding why Eurotunnel was seen to be committed to managing and mitigating the social and environmental issues associated with the Channel Tunnel it is valuable to explore public perceptions towards the development. The public was opposed to aspects of the Channel Tunnel before its inception (Essex & Gibb, 1994, 57). This opposition can in part be attributed to the wide variety of impacts that were projected to be felt within Nord-Pas de Calais and Kent. Environmental protests in Nord-Pas de Calais and Kent become frequent events once it was publicly announced that Eurotunnel had been given the mandate to build and operate the Channel Tunnel. A corollary of this opposition was that environmental concerns came to the attention of national and international media organisations. Such attention meant that Eurotunnel had to be seen to recognise the environmental issues from the outset. French environmental groups were not as active as the British groups and as a consequence additional environmental constraints were placed on the construction of the Channel Tunnel in Britain (European Commission, 1996, 82).

A large proportion of local residents in Nord-Pas de Calais and Kent strongly opposed the Channel Tunnel development. Public agencies in these two areas gathered information to lobby against aspects of the development (Essex & Gibb, 1994, 57). With the proposal being given the go-ahead and the legislative background established to allow for the development, the public was forced to focus on ensuring that appropriate measures were taken to protect the public and the environment from the detrimental effects that would come as a result of this venture. To do this the developers and councils publicly released reports such as the Kent Impact Study to help outline to the public the impacts projected to arise as a result of the Channel Tunnel development. These reports were then used by the public when they presented issues of concern to Eurotunnel.

Regional authorities, local residents and environmental organisations were given the opportunity to voice their concerns providing that they could prove *locus standi*. Although people were given this opportunity, the overall process of contestation has been openly criticised. This has in part been attributed to the fact that at the time of the development there was no comprehensive process governing how to deal with social and environmental impacts. This meant that the process employed by the developers as not necessarily tried and tested. Eurotunnel endeavoured to annul public concern by establishing organisations and structures while conducting research in an attempt to find solutions that would satisfy local residents. In light of this, a number of social and environmental issues were addressed prior to the construction of the Channel Tunnel. Examples of issues that were addressed in this way include roading and land acquisition as outlined in Chapter Three.

The general public was concerned about the disruption that construction would have on their daily lives. Eurotunnel used public consultation and public exhibitions to help identify the concerns of local residents. This gave Eurotunnel the opportunity to explore mechanisms that might be employed to

mitigate the issues accordingly. Although it was impossible to render invisible all the issues, developers did attempt to address and manage the issues under the watchful eye of local residents and authorities. The level of public participation in the design, construction and operational phases of this development is difficult to determine. The primary reason for this is that a large proportion of the literature produced on public consultation is “constrained by the need for confidentiality” (Goodenough & Page, 1994, 45). This means that drawing precise conclusions about the mitigation methods Eurotunnel used to dispel public concern is difficult to accurately determine.

6.3 The positive impact

In order to comprehensively examine the Channel Tunnel development it is necessary to place some emphasis on the positive impacts that this development has had on the environment and society. Measuring positive impacts is characteristically subjective, ambiguous and difficult to quantify. This occurs because there is often no direct link between the development and the social and environmental benefits. In line with this, the points made below remain subjective and for this reason they have been identified and supplied as a supplement to the overall themes in this chapter. Two social benefits that have been reported to be associated with the development of the Channel Tunnel are the reduction in road accidents and road congestion (Devon et al., , 43). These benefits have been attributed to the transfer of freight from road to rail (European Commission, 1996, 82). It was projected that freight transference or ‘piggy-backing’ would also help curb traffic congestion (TED Case Studies, 3).

Although there has been a tangible reduction in freight traffic due to the transfer from road to rail, it is important to recognise that this does not necessarily mean that there was a net reduction in road usage. This is because the reduction in traffic volumes from the transference in the mode of freight transportation, may have been counteracted by the increase in traffic flows in Nord-Pas de Calais and Kent from the construction and operation of the Channel Tunnel. It has been reported that, on the whole, traffic volumes have risen, although the exact figure is difficult to quantify because of data gaps. Problems with data comparisons occur as there was a limited amount of statistical data collected on traffic volumes in and around Nord-Pas de Calais and Kent prior to the establishment of the Channel Tunnel. In light of this, no accurate traffic volume comparisons can be made.

While the transfer of freight from road to rail may have had a positive impact on the environment through declining pollution levels, the increase in road usage from people travelling via the Channel Tunnel has arguably increased the overall vehicle pollution levels emitted within Nord-Pas de Calais and Kent. In addition, while construction noise levels may also have declined since the end of the construction period there has been additional noise created from the operation of the Channel Tunnel which has in effect resulted in noise transference rather than a net reduction in noise.

6.4 The environment

It is undeniable that the local landscape was significantly affected by the construction of the Channel Tunnel. One environmental issue that was of concern to environmentalists and the general public was the acquisition and conversion of agricultural land. A large area of land was adapted for construction purposes. Much of the land used by Eurotunnel had traditionally been used for agricultural means. The vast majority of this land was however, returned to the owners once it was no longer required. Land possession of this nature had a direct impact on the environment. This is demonstrated by the fact that a large volume of vegetation was destroyed on land that was temporarily and permanently acquired for the construction and subsequent operation of the Channel Tunnel.

The temporary and permanent acquisition of land had a significant impact on local residents. Although financial compensation was granted when people were forced to relocate, people in this predicament had their lives transformed. Daily routines, income, lifestyle and schooling are some common examples that illustrate how everyday aspects of local residents' lives were affected.

Landscape was another environmental concern that took centre stage for locals and the developers. This issue was of particular concern for residents living in and around the Channel Tunnel entranceways. People often choose to live in a certain area because of its surrounding habitat. That said, it is not surprising that the prospect of the woodlands that people once admired from their kitchen window being replaced with concrete walls was not an appealing exchange. People who were going to be affected in this way openly voiced concern to the developers. This concern resulted in Eurotunnel being made accountable for ensuring that the visual landscape of the area was left or restored to be aesthetically pleasing.

Considerable emphasis was placed on Eurotunnel to be accountable for the impacts associated with land excavation. Parliamentary petitioners, local and statutory authorities, members of the public and conservation bodies called for Eurotunnel to give public affirmation outlining the "extent and horticultural details [of] the landscape proposal" (Kershaw & McCulloch, 1993, 62). In addition, the House of Lords select committee was obliged to publicly release material about the development sites so the public could identify areas of concern. In an attempt to address the concerns expressed by local residents Eurotunnel submitted a proposal to the local authorities reaffirming that vegetation would be replanted and agricultural land restored to its original state.

In keeping with the natural landscape Eurotunnel chose to replant species that were reflective of the local environment (Channel Tunnel Rail Link, 2002, 7). The restoration plan sought to ensure that the landscape was restored to be aesthetically pleasing, that vegetation screened the railway where appropriate and that the landscape encompassed woodlands that would be made publicly accessible (Channel Tunnel Rail Link, 2002, 7). In addition to restoring

agricultural land, Eurotunnel had to ensure that soil structures were preserved while being relocated and that soil was adequately stored. This helped to ensure that only minimal intervention was needed to alleviate residual compaction during restoration (Channel Tunnel Rail Link, 2002, 11).

It is interesting that chalk grassland topsoil was taken from temporary work areas, re-spread at different areas, managed for the duration of construction period (three years) and then replaced in the areas that it had been taken from (Kershaw & McCulloch, 1993, 24). Eurotunnel was also seen to take some responsibility for the environment through the application of their Environmental Management System (Channel Tunnel Rail Link, 2002, 11). Within this work area Eurotunnel employs full time site managers and support staff who are responsible for environmental protection (Channel Tunnel Rail Link, 2002, 11). The Environmental Management System project coordinators worked closely with local authorities to manage and mitigate the environmental issues that arose as a result of the construction of this development.

Damage to the landscape was an issue that was covered in the early EIA reports. The Nature Conservancy Council was one party that outlined a number of concerns to the select committee. Holywell Coombe was one area that the Council petitioned strongly against being disturbed by the project. They opposed key geological deposits being disturbed during the construction period. Due to geographical and track work constraints Holywell Coombe could not be left totally undisturbed but a mitigation method was adopted which saw Eurotunnel leave half this area undisturbed.

Figure 6.4.1 Holywell Coombe



Sourced from (Biggart *et al.*, 1992, 13).

The picture above was taken in 1986 prior to the construction of the Channel Tunnel.



Sourced from (Biggart *et al.*, 1992, 13).

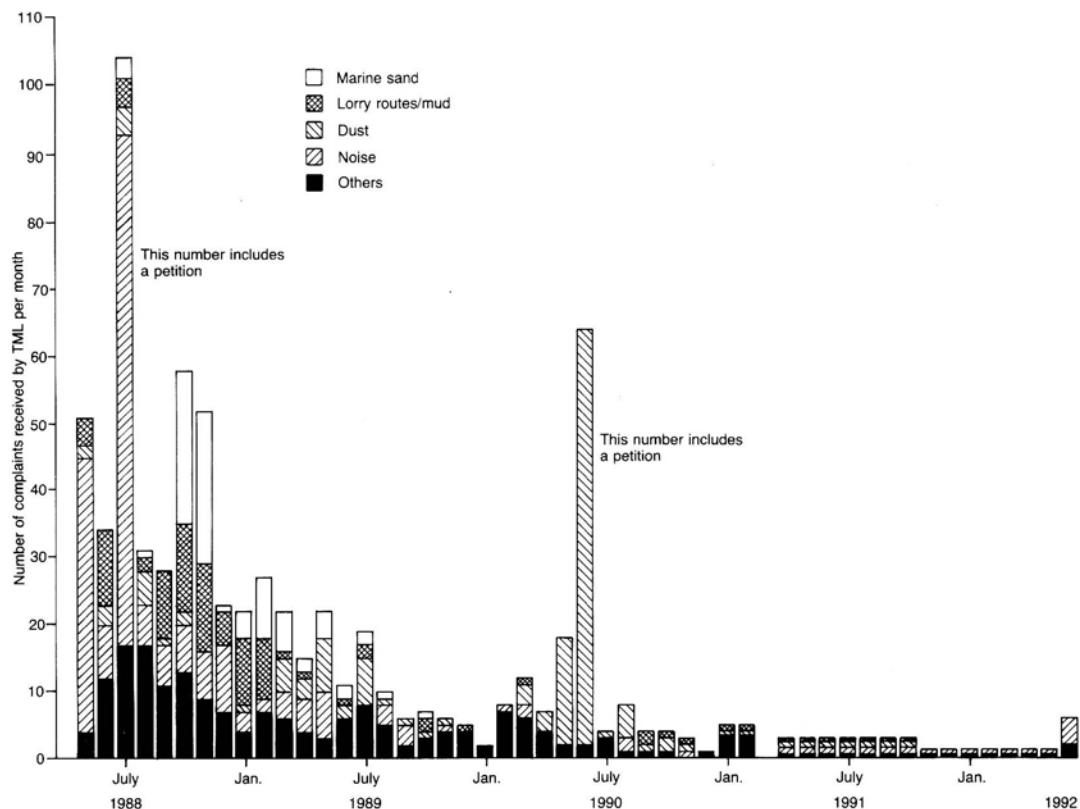
The illustration above shows Holywell Coombe in August 1989 at the peak of construction. This picture shows the portion of this area that was left undisturbed.

There has been an apparent lack of literature released on ‘green’ opposition during tunneling (TED Case Studies, , 2). Although some reference was made towards the impact that this development had on the environment, literature focuses on logistical aspects of this venture. Page provides insight into why this may have occurred. He asserts that although a “number of assessments of the Channel Tunnel’s potential impact on the human and physical environments have been undertaken by economists and geographers....these have not been disseminated widely, since much of the research has been technical, and in some cases confidential to clients when undertaken on a consultancy basis” (Page, 1994, 3). Recognising the complaints received from the public throughout the construction phase provides insight into the issues that the public were concerned about between 1986 and 1994.

By the end of 1990, 378 people out of a population of 37,960 living in the Kent region had lodged 618 complaints against the construction works (Kershaw & McCulloch, 1993, 27). In other words, one percent of Kent’s population made

a formal complaint against the development in question in 1990. A significant proportion of Kent's population does not live in close proximity to the Channel Tunnel terminals. This means that a significant proportion of the public living in close proximity to the construction sites felt they were adversely affected. These complaints were logged by public relations staff and environmental staff were on hand to provide information and technical know-how when required (Kershaw & McCulloch, 1993, 27). Some attempt was made to mitigate grievances. To do this, Eurotunnel liaised with the general public and the Channel Tunnel Complaints Commissioner followed up genuine complaints with the local authorities (Kershaw & McCulloch, 1993, 29).

6.4.2 Construction complaints



The graph above outlines the number and nature of monthly complaints received by Eurotunnel from the general public during the construction of the Channel Tunnel (Kershaw & McCulloch, 1993, 27).

6.5 Land Issues

The land that was permanently and temporarily taken for construction purposes was a contentious issue from the beginning. Temporary and permanent land possession was legislated for in the Channel Tunnel Act. As demonstrated in Chapter Three this piece of legislation set out how, when and by what means, Eurotunnel could take short term or permanent possession of land for construction purposes.

A portion of the land that was used for construction purposes was government owned. In addition, only a small proportion of land was permanently required by Eurotunnel to manage and operate the Channel Tunnel. In light of these two points, only a small proportion of local residents have to permanently give up their land and homes. However, this does not detract from the fact that the social costs of land acquisition were significant. Although some of the social impacts were short term in nature there were some long term concerns associated with land acquisition. Examples of long term issues include visual landscape and land restoration.

In accordance with the legal foundations governing land acquisition, a large proportion of the high grade agriculture land that was utilised for construction purposes, was restored to its former condition and returned to the farming community after the construction of the Channel Tunnel had been completed (Channel Tunnel Rail Link, 2002, 3). Compensation was awarded to landowners who had to give Eurotunnel permission to use their properties temporarily or permanently. The dominant means of reparation was financial reimbursement for inconvenience and loss of income. Adequate financial compensation was a contentious issue. Obviously Eurotunnel wanted to pay the minimum possible while people in this position needed to feel that they were being satisfactorily compensated.

A number of land disputes ended up in court. In most instances Eurotunnel and the claimants negotiated the compensation figure. The general idea underpinning these negotiations was the greater the impact the larger the figure of financial compensation that was awarded to the affected parties. Those who received financial compensation were not necessarily happy with the amount they received however given the contentious nature of financial compensation disparities of this nature are somewhat inevitable.

Land valuation and the resale price of properties proved to be another controversial impact fuelled by the establishment of this piece of infrastructure. Land depreciation caused a great deal of ill feeling. This is demonstrated by one example where three claimants sought an injunction against Eurotunnel as they believed they had been unable to sell their properties for the "true market price" (LexisNexis, 1995, 1).

A number of other cases illustrate how local residents felt that the Channel Tunnel development had an impact on the resale value of their homes (LexisNexis, 1995, 1). A number of people proceeded with grievance cases via the legal system. In these instances the claimants sought compensation

under private law which meant that they had to pay to file legal proceedings (LexisNexis, 1995, 1). Compensation awarded was done so in accordance with the Channel Tunnel Act. Some of the cases that proceeded to court went in favour of the complainant, although the figures and details of such settlements are confidential. Concern relating to land depreciation was expressed by residents from the early stages of the project design. This is not surprising given that noise disturbance caused by the construction of the Channel Tunnel did in some instances affect the land value of the properties in and around the immediate vicinity of the two Channel Tunnel entranceways.

6.6 Soil disposal

Early on in the design process developers acknowledged that soil disposal was an issue that needed to be managed. It was known that the Channel Tunnel would have a mammoth impact on the landscape due to earthworks. Sand was pumped rather than trucked to reduce the environmental impact of this activity (Duggleby & Pilkington, 1993, 42). Duggleby suggests that soil disposal had a significant impact on land and vegetation (Duggleby & Pilkington, 1993, 42). Other negative impacts that came from redistributing soil included salt drainage and dust (Duggleby & Pilkington, 1993, 43).

A large volume of surplus soil, greensand and gault clay was generated through the excavation of the Channel Tunnel. At the conclusion of the construction period, tunnel workers had mined 10 million cubic metres of soil from under the English Channel (Eurotunnel, 2003a, 5). Eurotunnel had to design a plan that would satisfy governments, environmental bodies and the general public. Two major schemes were eventually adopted to mitigate the effects of soil disposal. The final product of these two schemes would come to be known as Fond Pignon and Samphire Hoe.

Soil disposal proved to be a problem as soil needed to be transported and disposed of at varying locations. Both construction sites were underpinned by greensand and gault clay (Duggleby & Pilkington, 1993, 42). In France and Britain greensand was used as a foundation for embankments while the sand was pumped into lagoons (Duggleby & Pilkington, 1993, 42). On the French side, the soil that had been extracted was mixed with water to form a slurry and was then pumped to Fond Pignon (Jensen, 5). Over time this mud mixture solidified and this soil provides the grounding for a park which is now known as Fond Pignon. This park was designed to be aesthetically pleasing so that it would fit into the landscape of Cape Blanc-Nez (Eurotunnel, 2003a, 5). At the completion of construction Eurotunnel replanted this area which is nowadays a nature reserve that is a popular site for wildlife (Eurotunnel, 2003a, 5). This reserve also provides for a variety of recreational activities such as walking and biking. A French coastal conservation authority (Conservatoire du Littoral) has been entrusted with the responsibility to ecologically manage this area (Eurotunnel, 2003a, 5).

At the British end, excess soil was disposed of along Shakespeare Cliff (Jensen, 4). The main intention of placing soil in this location was that it was anticipated a small level bed on the waterfront would be a useful tool for

storing equipment needed for the construction of the Channel Tunnel (Jensen, 4). Eurotunnel made an effort to avoid transporting soil on public highways and to reuse soil (Channel Tunnel Rail Link, 2002, 4). From an environmental perspective it was inadequate to dump the soil on the waterfront, so, Eurotunnel decided to construct a “seawall” which came to be known as Samphire Hoe (See Author). This 75 acre area is essentially a new piece of British land which is found at the foot of the Dover cliffs (See Author). Although this area was primarily designed for construction purposes at the completion of the Channel Tunnel, this land was made available to the public.

In July 1997, part of Samphire Hoe was opened to the public for recreational activities such as bird watching, walking and sea angling (See Author). Particular attention was paid to ensure that there is continual wildlife conservation and visitor management in this area. This site provides a habitat for about “130 species of plant, 80 species of bird and over 200 species of invertebrates” (Eurotunnel, 2003a, 5). These two areas, Fond Pignon and Samphire Hoe are the largest visible legacies left from the construction phase of the Channel Tunnel (Eurotunnel, 2003a, 5).

6.7 Noise pollution

Noise pollution was an issue of concern for local residents from the outset. A significant volume of noise was generated through transporting materials needed for the construction of the Channel Tunnel. In addition to construction materials, transporting soil, sand and gravel was an issue that took centre stage for developers (Deakin, 1986, 112). The noise and dust created from transporting materials exasperated local residents. In an attempt to mitigate this issue, developers ensured that transported material was sprayed with water, covered and moved during working hours (Kershaw & McCulloch, 1993, 27). This helped ensure that dust was contained to a minimum and residents were not disturbed during the evening by heavy vehicles. Transporting materials for construction purposes was also confined to daylight hours.

Although this mitigation strategy was effective for people who worked outside of their homes during the day, this issue still had a considerable impact on shift workers, homemakers, the elderly and home based employees and employers. Although noise pollution from the construction of the Channel Tunnel was a concern for developers and the public, the short term nature of this problem meant that developers and local communities placed greater emphasis on mitigating the issues that occurred through the operation of the Channel Tunnel. This issue is examined in more depth in Chapter Seven.

In addition to noise pollution, road congestion became a contentious issue. Nord-Pas de Calais and Kent are rural areas and as a result the roading networks in these two areas are not adequate to accommodate large volumes of traffic. Lorries travel more slowly than cars and are often the catalyst to traffic delays and congestion. The terrain in Nord-Pas de Calais and Kent is varied and each region has a number of windy narrow sections of road. Not

surprisingly, being stuck behind traffic travelling these routes was exceptionally frustrating for local residents.

6.8 Conclusion

Eurotunnel was forced to work towards finding methods to mitigate and manage issues early in the development and construction phases of the Channel Tunnel. The legislative framework enacted to govern this development made Eurotunnel legally accountable for managing the social and environmental issues. The increasing level of public concern towards social and environmental impacts was the driving force behind the legislative framework being enacted in a manner that made Eurotunnel accountable for the detrimental impacts that came as a result of the Channel Tunnel. The early EIA's conducted during the development phase meant that social and environmental issues were recognised from the outset. Issues that were identified from these EIA's included public opposition, environmental impacts, land possession, soil disposal and noise pollution. While these impacts all affected the environment they also affected the social contexts of Nord-Pas de Calais and Kent.

The significant environmental impacts associated the construction of the Channel Tunnel as discussed in this chapter were land possession, soil disposal and pollution. All these impacts had social implications. Impacts on society clearly visible from the construction phase were; road congestion, dust contamination, noise disruption from transportation of soil and materials, aesthetic disruption to the landscape, loss of income and disruption to lifestyle. Eurotunnel developed a variety of mitigation strategies to combat these issues. Dampening, covering and restricting the hours of transportation are all examples of mitigation methods. Although none of the issues identified throughout this chapter were rendered invisible, Eurotunnel was seen to make an effort to address and manage the concerns that came as a result of the construction of the Channel Tunnel. Nevertheless, it is clear that construction works resulted in significant quasi-permanent impacts on the landscape, hydrological systems and ecosystems in Nord-Pas de Calais and Kent (Hay *et al.*, 2004a, 21).

7.0 Post development issues that have arisen since the Channel Tunnel commenced operations in 1994

Extending on from the construction period, this chapter identifies the issues that have prevailed since the Channel Tunnel opened for business in 1994. Since this time, the importance of some operational issues has grown, while other concerns have been annulled through measures designed by Eurotunnel and respective governments.

The issues examined in this section include public opposition, environmental disturbance, water pollution, noise disturbance, energy consumption, water contamination, fire safety and asylum seekers. These issues have affected every facet of society in the two regions under examination. The effect of these impacts on the people living in Nord-Pas de Calais and Kent is analysed throughout this chapter.

The mechanisms employed to combat these issues are varied. Consultation between Eurotunnel, the French and British governments and the general public remains a constant and essential theme that has helped to ensure that the issues are addressed and resolved where possible.

7.1 Public opinion

In understanding the pertinent issues it is important to recognise that these issues have not necessarily arisen due to poor planning and management by the Eurotunnel syndicate. On the contrary, there are long term problems that arise as a result of any form of development. It is important to keep this in mind throughout the following analysis and to remember that responsibility for these issues falls on a number of bodies. The main caretakers of the Channel Tunnel are the French and British governments, the EU and Eurotunnel.

It is also important to recognise that these issues, while important, are only some of the effects that have occurred as a result of the construction of Channel Tunnel. Due to the scope of this report it has been impossible to examine all the matters that have arisen from this development. This piece focuses on the issues that have reoccurred throughout the literature examined. In light of this, I have deemed them to be important for the purpose of this report.

As identified in the previous chapter, the Channel Tunnel has always had its promoters and detractors. A large portion of those who opposed the Channel Tunnel development in the initial design and construction phases, are satisfied with the eventual development. Although this may be in part true, there are a number of other factors that may have influenced the level of visible public opposition. Some reasons behind the reduction in opposition may be attributed to the fact that people may be satisfied with the methods Eurotunnel has been seen to employ. In addition, the impacts that once concerned groups may no longer exist. The other feasible scenario is that groups have not been able to sustain the time and energy that goes into opposing an extremely powerful bureaucratic machine. There is still however, some

concern from groups pertaining to the ongoing social and environmental impacts associated with the running of the Channel Tunnel. Post development, issues relate to the continuous disruption that this development has on local residents. Since the Channel Tunnel began operating the three issues of major concern for local residents have been traffic management, road conditions and noise and vibration (Channel Tunnel Rail Link, 2002, 16).

7.2 Eurotunnel's role

Eurotunnel is obliged to mitigate the operational impacts that the Channel Tunnel is having on the environment and society. In accordance with this, Eurotunnel has committed to employing a variety of measures to minimise the environmental impact of this development. As legislated for in the Channel Tunnel Act 1987, Eurotunnel was allowed to retain ownership of some land for operational purposes. The two areas of land still owned by the Eurotunnel consortium are found at Sangatte and Cheriton. These areas are currently the sites of the two Channel Tunnel entranceways.

In adherence with the legislative framework governing this development, Eurotunnel has committed to post construction monitoring and evaluation of habitats and species. Special attention has been given to the re-colonisation of rare plants and consideration paid to the habitats of breeding birds and amphibians to ensure they are not being destroyed (Channel Tunnel Rail Link, 2002, 9).

This level of monitoring comes at a considerable cost to Eurotunnel, so why are they still seen to be addressing environmental and social concerns? From the developers viewpoint, continuing to produce environmental reports and consulting with groups comes at a considerable financial cost. These financial costs are invariably ones Eurotunnel would prefer not to bear. The main reason behind Eurotunnel's continuing commitment to providing such reports and services is legislation. During the planning phase of this development, social and environmental concerns were publicly heard, and in turn, social and environmental awareness enhanced. As a result, the legislative framework established made Eurotunnel accountable for the adverse effects that would occur as a result of the Channel Tunnel development. In agreement with these legislative requirements, Eurotunnel has to continue to recognise environmental concerns, managing and mitigating them accordingly.

7.3 Water pollution

Water Pollution has been a significant environmental issue since the Channel Tunnel commenced operations in 1994. Environmental provisions hold Eurotunnel responsible and make them legally obliged to manage the environmental concerns accordingly. The protection of surface and ground water is one factor that was recognised as an area of concern for local residents. As a result, structures were implemented to ensure that silt contamination was kept to a minimum. Although precautionary measures were taken, silt deposits did accumulate and streambed cleaning had to be undertaken by Eurotunnel to cleanse the waterways to evade damaging

stream flora and fauna (Channel Tunnel Rail Link, 2002, 11). It is interesting that this environmental concern was addressed in a reactive rather than a proactive manner.

In addition to sampling and surveying, Eurotunnel has taken a more active role in protecting the purity of water in and around the Channel Tunnel terminals. This is demonstrated by the fact that Eurotunnel built an urban biological purification plant in France (Eurotunnel, 2003a, 13). The purification plants Eurotunnel already operate extract some 150 tonnes of dry matter each year (Eurotunnel, 2003a, 13). Eurotunnel is in the process of examining the installation of a piece of apparatus that can recycle the water used by the cooling plants (Eurotunnel, 2003a, 13). Feasibility studies on this machine are currently being carried out, and providing that the financial and technological aspects of the project can be justified, Eurotunnel will potentially be able to recycle between 5,000 and 10,000 cubic metres of water per annum (Eurotunnel, 2003a, 14). At present, lime is added at a level of 28% to the dry matter to stabilise waste sludge (Eurotunnel, 2003a, 14). This results in a total of 800 tonnes of raw sludge being disposed of each year (Eurotunnel, 2003a, 14). The law currently allows Eurotunnel to dispose of this lime sludge on neighbouring farmland (Eurotunnel, 2003a, 15).

Since the Channel Tunnel commenced its operations, Eurotunnel has been legally obliged to comply with the maximum and minimum waste water discharge levels. This compliance is done in accordance with the standards set out by the independent legal statutes that govern waste water management in France and Britain (Eurotunnel, 2002, 8). In accordance with these standards of legislation, Eurotunnel continuously monitors the "pH, temperature and ratio of suspended solids in the wastewater discharged" to ensure that storm and waste water toxicity levels comply with the regulatory requirements (Eurotunnel, 2003a, 13). To do this Eurotunnel employs people to take water samples from a variety of discharge points. Full laboratory tests are conducted and it has been reported that the water from all the points tested complies with the maximum and minimum toxicity levels (Eurotunnel, 2002, 8).

Preventative measure like those mentioned above help to ensure that polluted water does not seep into local waterways, yet these systems do not necessarily ensure that contamination will not occur. While Eurotunnel does comply with the guidelines in the appropriate legal statutes, these pieces of legislation only stipulate that water discharge pollution levels should not go above a predetermined rate. That said, the water released still contains a level of contaminants. Although the level of contamination will not endanger human life, pollutants are being released into waterways that are used for human cultivation. This means that people are watering plants, feeding crops and nourishing animals with water that contains low levels of contaminants.

7.4 Noise disturbance

Eurotunnel recognised that noise pollution was going to be an ongoing concern generated through the operation of the Channel Tunnel. While noise concerns were an issue for those working within the compounds of the Channel Tunnel infrastructure, the predominant concern came from local residents in Nord-Pas de Calais and Kent. There has been a large volume of concern expressed about the noise disturbance caused by the Channel Tunnel. This is one reason why the two Channel Tunnel terminals have been the seed of major concern for local residents. The long term nature of this issue has meant that Eurotunnel has to continually acknowledge and address the concerns of local residents.

Figure 7.4.1 Cheriton terminal



This is a picture of the Channel Tunnel terminal in Kent, Britain. It illustrates the size of the terminal and shows how close the structure is local housing (Wikipedia, 2005, 1).

Eurotunnel has performed noise surveys and inaugurated a programme that measures noise levels at both terminals (Eurotunnel, 2002, 9). The objective of these programs is to monitor any changes in noise levels and to ensure that Eurotunnel is in compliance with the legislation that stipulates noise levels (Eurotunnel, 2002, 9).

A corollary of these studies shows that Eurotunnel has made a number of adaptations to its existing infrastructure to minimise the noise disturbance for local residents, for example, loudspeakers were identified as a considerable disturbance. In light of this, Eurotunnel has prohibited the use of the public address systems between the hours of 22.00 and 7.00 except in the case of an emergency (Eurotunnel, 2003a, 15). Eurotunnel employees also have to ensure that messages are not simultaneously broadcast inside and outside the passenger buildings (Eurotunnel, 2003a, 15). Finally, public addresses are not made when there are strong winds “as the messages are frequently inaudible in such conditions and serve to be a considerable disturbance to residents living in close proximity to the Channel Tunnel entranceways” (Eurotunnel, 2003a, 15).

A number of mechanisms were used to minimise the disruption that this venture had on local residents. These measures included, covering the UK terminal, installing soundproof dwellings on the UK side and the establishing an embankment surrounding the Sangatte site (Eurotunnel, 2002, 9). Extensive noise barriers and earth bunding has also helped shelter communities from the noise of the trains (Channel Tunnel Rail Link, 2002, 7). Eurotunnel has continued to implement and identify noise mitigation strategies. In 2002, timber wayside barriers and low level steel barriers on bridges were installed to reduce noise (Channel Tunnel Rail Link, 2002, 7). Measures such as this have helped to reduce this problem, but ‘noise’ will remain an issue for the duration that the Channel Tunnel continues to operate.

Since the Channel Tunnel started operating in 1994 the noise emissions created by this development have been deemed satisfactory as they comply with the standards set out in the appropriate legal statutes. However, looking into the public sphere, a different perception emerges. Many residents argue that the noise emissions from the Channel Tunnel remain an annoying disturbance. Noise pollution has an impact on people’s lives as it affects sleeping patterns, particularly for shift workers and those residents who spend the majority of their day at home, such as the elderly, homemakers and home based employees and employers. Although Eurotunnel is continually making an effort to minimise noise disruption wherever possible, it appears that this issue will continue as long as the Channel Tunnel operates.

7.5 Energy consumption

Over the last 50 years there has been a dramatic shift in focus towards environmental sustainability. One aspect of considerable concern is energy consumption. Eurotunnel recognised this and has worked towards creating energy efficient operations since the design phase of the development. This is demonstrated by the fact that Eurotunnel chose to employ electric trains as the means of transport to travel through the Channel Tunnel. Their energy saving policies has meant that their electronic locomotive fleet has been continuously upgraded. Eurotunnel currently operates a number of 7 MW⁸ electronic locomotives (Eurotunnel, 2003a, 17). Aside from this example, Eurotunnel has been seen to minimise energy consumption from Channel Tunnel operations through other means.

Since 1994, Eurotunnel has worked towards making the overall operation of the Channel Tunnel more energy efficient through adaptations to the existing infrastructure. Alterations have been made to terminal lighting, cooling and pumping systems, lamps and lighting paraphernalia (Eurotunnel, 2003a, 17). Furthermore, electricity metres have been assessed and modified in an attempt to reduce energy consumption (Eurotunnel, 2003a, 17). In 2002 and 2003 additional alterations were made to the existing electrical equipment. Twilight sensors were installed to optimize on/off lighting (Eurotunnel, 2003a, 17). It has been estimated that these modifications have saved one hour's worth of energy each operating cycle (Eurotunnel, 2003a, 17). In addition, research has been performed that examines the voltage regulation techniques and a variety of different lamps have been installed in accordance with recommendations made from a two year comparative study (Eurotunnel, 2003a, 17).

A number of long term energy saving strategies have been appraised by Eurotunnel over recent years. Examination of this nature has seen Eurotunnel participating in software development that will reduce future electricity consumption (Eurotunnel, 2003a, 17). Eurotunnel also signed an energy agreement with a French electricity company (Eurotunnel, 2003a, 17). This covenant is seeking to establish a wind farm near the French terminal although this initiative is still subject to the approval of planning consents. Investigation into the viability of this renewable energy source reiterates Eurotunnel's stated commitment to long term environmental sustainability for Eurotunnel. The benefits of energy efficient systems are two-fold. Firstly, they are publicly seen to be concerned with environmental sustainability and secondly, a reduction in energy usage will reduce the Channel Tunnel's running costs.

⁸ A locomotive is a railway vehicle that provides the motive power for a train. Electric trains are cheaper to run than steam fueled trains and environmentally friendlier. This is because electronic trains they do not emit the same levels of carbon dioxide (CO₂) into the atmosphere as steam fueled trains. MW refers to the amount of power used to run a train. The 7 MW electric locomotives are the most energy efficient, high speed power systems currently available on the market.

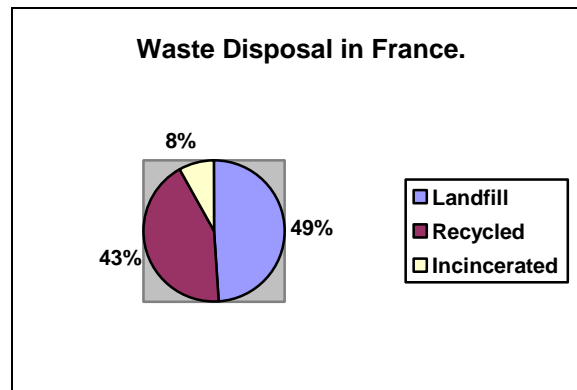
Energy consumption affects us all in some way. Many natural resources used to create energy, such as water, are renewable yet resources used to generate energy, such as coal, are non-renewable. Across the globe natural resources are depleting and in recognition of this there has been a move away from using non-renewable resources whenever it is feasible to. Once the natural resources that are currently used to create energy are destroyed, our only option will be to find alternative energy sources. An alternative energy resource will come at a considerable financial cost to society because of the extensive research and development required. Another corollary of this is that as our natural resources become scarce the prices for these products will increase. Eurotunnel is a large company that consumes extraordinary amounts of energy through their operations. Energy consumption of this nature affects us all, and it is imperative that Eurotunnel continually seeks to minimise energy consumption wherever possible. If these effects are not clearly visible to us now, it is inevitable that we will bear the brunt of this impact in the years to come.

7.6 Waste sorting

Large volumes of waste are generated from the daily running of the Channel Tunnel. That waste is a social and environmental concern which will exist for as long as the Channel Tunnel continues to operate. Developers were aware of this issue during the initial planning of the project. Recognising this issue and in accordance with the environmental constraints placed on the development, Eurotunnel sought to implement systems and use materials to minimise the waste produced from the Sangatte and Folkestone terminals. A major component of this focus was waste management.

Overhauling equipment and facilities, modification of waste flows and the establishment of a waste flow facility at the French terminal are ways in which Eurotunnel has sought to minimise the environmental impacts of this development (Eurotunnel, 2002, 11). Hazardous waste products are collected, stored and disposed of by companies that specialise in waste management. The 2002, figures released demonstrated that there had been a tangible reduction in the quantity of waste disposed of via landfills (Eurotunnel, 2002, 11). This reduction was achieved by Eurotunnel focusing on alternative waste disposal methods such as recycling. This is not to say that the situation is perfect, there is still a considerable amount of waste that is not disposed of in an environmentally friendly manner, but the systems currently in place are a step in the right direction.

Figure 7.6.1 Breakdown of processing method of waste disposal from the French terminal in 2003



Sourced from (Eurotunnel, 2003a, 15).

The graphs above illustrate the current means of disposal for the waste generated from the French and British terminals and demonstrate Eurotunnel's focus on the environment, epitomised by a significant proportion of waste in each region being recycled. These graphs were adopted from Eurotunnel's 2003 environmental report (Eurotunnel, 2003a, 15).

Waste disposal has a direct and acute impact on the environment and people. The primary reason that there are government restrictions placed on waste disposal is because if waste is not discarded in an environmentally friendly manner, waste contamination can occur. Waste contamination can be potentially hazardous to human life if it manages to seep into waterways used for agricultural or drinking purposes. Given this fact, it becomes obvious how human lives can potentially be affected when polluted water or other waste is not disposed of in an environmentally acceptable manner.

7.7 Fire prevention

Fire prevention was an issue that was recognised early on in the design phase. In compliance with the Channel Tunnel Act, safety measures were incorporated into the design of the Channel Tunnel. While fires can potentially threaten human life they can also cause devastation to vegetation and wildlife if appropriate fire prevention methods are not established. Eurotunnel has established a safety authority for advising and assisting the Inter Government Commission on all safety matters concerning the operation of the Channel Tunnel's systems (Officers of Devon Council *et al.*, 1989, 21). Fire prevention measures have been established in the Channel Tunnel. Materials that are hard to ignite and do not release dangerous fumes when ignited were used (Institution of Electrical Engineers, 1997, 5). In addition to this, control systems and detection measures were installed in the trains and the Channel Tunnel itself to extinguish fires should they ignite (Institution of Electrical Engineers, 1997, 6).

In November 1996, the Channel Tunnel fire control systems were tested by a fire that erupted in freight containers (Neerhout, 2001, 26). Two security guards noticed smoke coming from one of the freight containers prior to the train entering the Channel Tunnel (Neerhout, 2001, 3). By the time Channel Tunnel officials were notified of the fire the train had entered the Channel Tunnel and the smoke and fire alarms within the fixture simultaneously alerted officials to the fire (Neerhout, 2001, 3). The train became enveloped in smoke and the control centre pulled the train to a stop. In the time that followed, the passengers and crew inside the train were evacuated by a rescue team (Neerhout, 2001, 4). The fire continued to burn throughout the night damaging the Channel Tunnel, it took over seven months to repair the damage (Neerhout, 2001, 3). Investigations later showed that the fire was a result of arson but it gave Eurotunnel the chance to show the critics that the fire control systems they had implemented were effective. In the long term, Eurotunnel has to ensure that the fire prevention and fire control systems are continually updated to protect the safety of all.

Fire safety was an issue of concern due to the fact that fires can potentially threaten human life. If a fire should erupt within the Channel Tunnel a person's ability to escape is limited due to the fact that they are trapped in an enclosed space. To ensure the safety of all passengers travelling through the Channel Tunnel, Eurotunnel has installed facilities to prevent and eliminate fires should they occur. In addition to being life threatening, fires have the ability to turn fertile land into barren deserts, destroying homes, infrastructure, wildlife and vegetation if they are not contained. If adequate preventative fire systems are installed, the risk of fire breakouts and fire damage dramatically reduces. Eurotunnel has recognised this and been seen to have employed a variety of measures to ensure fire prevention and containment within the Channel Tunnel infrastructure and the Channel Tunnel's terminals.

7.8 Asylum seekers

The impact of asylum seekers was not fully understood until after Channel Tunnel began operating. This can in part be attributed to the fact that national circumstances of a number of European countries changed significantly after the construction of the Channel Tunnel had commenced. The fall of the Berlin Wall in 1989 and the collapse of the Union of Soviet Socialist Republics (USSR) in 1991 are examples of changes in national circumstances that indirectly influenced the asylum situation in France. Eurotunnel's terminal in Sangatte is the main location asylum seekers look towards when trying to travel from France to Britain. Immigration procedures are legislated in the Channel Tunnel Act. This act allows for immigration controls to be enforced on people entering and departing from the Channel Tunnel (The Crown, 2000, 1). Agreements between the British and French governments mean that all people leaving Nord-Pas de Calais are subject to immigration controls (Simmons, 1986, 2).

Refugees who arrive at the Channel Tunnel entranceways have commonly fled their homelands to escape persecution, civil war, poverty, dictatorship and grinding deprivation. A diverse range of nationalities from around Europe are

captured at the gates of the Channel Tunnel. Some prominent groups include Kurds, Turks, Afghanis, Iranians and Iraqis (Henley, 2001a, 1). French authorities used strict immigration controls to manage the French border in Colloquies. In an attempt to prevent asylum seekers, British immigration officials stringently scrutinise everyone travelling on the Eurostar service from France to Britain (Tyler, 2001, 2).

Eurotunnel has been working towards establishing effective systems that may alleviate the issue of asylum seekers. In accordance with this, Eurotunnel has invested £6 million into increasing their security (Henley, 2001b, 1). The tools implemented to maintain security include surveillance cameras, razor wire fences and infrared imaging equipment (Henley, 2001b, 1). In addition to these security mechanisms, Eurotunnel has had to consistently increase security guard numbers to patrol the Channel Tunnel's entranceways (English Welsh *et al.*, 2002, 57). Eurotunnel currently uses over 200 CCTV cameras, the gates are monitored by 24 hour surveillance and the site is engulfed by 23 miles of razor wire which acts as a means of deterrence (James, 2001, 2).

The systems identified above have come at a considerable financial cost to Eurotunnel. However, in light of the proposal from the British government which suggested that Eurotunnel should pay £2,000 for each illegal immigrant who was caught entering Britain via the Channel Tunnel, implementing systems such as these was in Eurotunnel's interest (Henley, 2001b, 1).

Prior to 1998, the Carrier Liability Act meant that aircraft operators could be fined up to £2,000 for every person caught entering the country on an airline (James, 2001, 2). This changed in 1998 to incorporate road haulers along with aircraft (James, 2001, 2). This Act means that drivers of the vehicles that cross via the English Channel can potentially be fined up to £2,000 for any person found upon a vehicle entering Britain.

Although legislation that would have made Eurotunnel financially liable for illegal immigration was never adopted, the idea of making Eurotunnel financially responsible highlights the pressure from government for Eurotunnel to be held accountable for illegal immigrants that cross the English Channel via the Channel Tunnel. Accountability under the current system remains highly contentious. France, Britain and the private entity Eurotunnel are all adversely affected by the growing problem of illegal immigration, yet no one is officially accountable for this quandary.

It has been reported that the French Channel Tunnel terminal faces surges of up to 400 asylum seekers every evening (Henley, 2001b, 1). A spokesperson for Eurotunnel stated that "the moment it gets dark the refugees start the short trek to the terminal, and you can literally see a stream of people" (Henley, 2001b, 1). Neighboring the Collogues centre in Sangatte sits a refugee centre that was established by the Red Cross in 1999 (Tyler, 2001, 1).

Figure 7.8.1 The Sangatte refugee camp



Sourced from (BBC News, 2001, 1).

The photograph above depicts the refugee centre at Sangatte. The cross above the door illustrates the presence of the Red Cross in the running of this facility (BBC News, 2001, 1).

This building was originally used by Eurotunnel to store building materials during construction (Francais, 2000, 3). After conversion this centre was initially established to house up to 400 asylum seekers needing refuge around the Calais area (Tyler, 2001, 1). While it was equipped to house 400 individuals the centre is currently home to over 1,600 refugees (Tyler, 2001,). Eurotunnel strongly opposed the centre being located in the Sangatte region. They have described this establishment as being a logistical “base for illegal immigration” (Henley, 2001a, 1). The Times released an article stating that “though no fault of its own except function and location, Eurotunnel is at the frontline of Britain’s defenses against illegal immigration” (James, 2001, 1). Eurotunnel holds a similar opinion believing that as a legally ascribed company they should not be held responsible for an issue that falls under the jurisdiction of the respective governments. Eurotunnel has argued that this is a European problem that needs to be addressed by the appropriate political powers.

The refugee centre has been the seed to much animosity between the British, French and Eurotunnel. The British media spotlight has played an instrumental role in heightening this Anglo-French conflict. British media institutions have served up a concoction of articles commenting on the Sangatte refugee centre and asylum seekers. While the British tabloids have criticised the French for establishing the centre so close to the Channel Tunnel entrance, the British government has suggested that the French government has closed “its eyes to the situation at Sangatte” (Tyler, 2001, 2). This has been rebutted by the French who have argued that if the British were to institute more stringent asylum procedures, the refugee predicament would improve (Tyler, 2001,2). The ideology behind this notion is if more stringent procedures were applied then asylum seekers would be deterred from coming to Sangatte and attempting to enter Britain via the Channel Tunnel. Although deterrence theory may be pertinent to this situation, Britain already has in

place some of the harshest asylum procedures in the European Union (Tyler, 2001, 2).

Eurotunnel has fought through the appropriate legal channels to annul the protectoral decree that allowed the refugee centre to be opened in 1999 (Tyler, 2001, 2). The administrative court in Lille received the application to close the refugee centre. The courts later denied the application, allowing the camp to continue being a safe house for refugees found around the area. Although this decision was made, France has agreed to drop the proposal to establish another Red Cross refugee center near the Channel Tunnel terminal in Calais (Henley, 2001b, 2). Furthermore, French officials have reaffirmed that they will take stronger measures against refugees that are caught breaking into Eurotunnel's compounds (Henley, 2001b, 2). This is by no means an end to this saga, on the contrary, the current arrangements will continue to fuel the conflict between the French, British and Eurotunnel.

Asylum seekers have had a colossal impact on one of Eurotunnel's vital business ventures, freight. The laudable objectives of Eurotunnel to increase their freight industry have been undermined by continual penetration of asylum seekers into the freight storage and holding facilities. Fréthum Yard remains the major storage facility designed to house freight in transience (English Welsh *et al.*, 2002, 57). This yard had been the scene of sabotage from asylum seekers since November 2001 (English Welsh *et al.*, 2002, 57). A substantial number of issues have arisen as a result of these activities. It has been suggested that Eurotunnel could take a more active role in prevention by installing adequate surveillance such as infra-red cameras and 24 hour gendarmes, establishing adequate fencing and overhauling all asylum seeking policy.

Eurotunnel is aware that stringent measures need to be installed to prevent the unlawful crossing of the Channel Tunnel. This is explicitly illustrated by the border control stations that have been installed at the British and French terminals. The French and British have been working collectively to develop tougher measures to deal with the asylum problem. The EU has also been seen as a crucial tool that can be employed to help combat this issue. The role that the EU currently plays will be discussed at length in the following chapter. During 2002, Eurotunnel mitigated these issues further by clearing 50 hectares of scrubland at the French terminal in an attempt to prevent asylum seekers from unlawfully entering the French terminal (Eurotunnel, 2002, 14). While this exercise was essentially a security measure, it also sought to prevent asylum seekers from disrupting Eurotunnel's commercial services (Eurotunnel, 2002, 14). It is inevitable that scrub clearance has had a colossal impact on the ecology of the area.

The impact of the asylum situation on individuals is twofold. Firstly, this issue directly impacts people living around the Channel Tunnel entrances. Security is one example of this. Given that refugees have no legal status they cannot legally work in France or Britain, how do they survive? One survival mechanism for those in this situation is crime. The freight companies have reported that they have fallen prey to such activities. This has meant that

people living around the Channel Tunnel entranceways have had to become 'security conscious' to protect their rights and property. The security threat imposed by asylum seekers is an excellent example of how people are being affected by this issue.

The second issue major of concern relates to the asylum seekers themselves. As previously identified, such people have characteristically fled their homeland escaping persecution, civil war, poverty, dictatorship and grinding deprivation. Refugees are protected by international law which articulates that they are entitled to all basic human rights. Was living in civil war a violation of their basic human rights? If so, does living in an overcrowded refugee centre in France also contravene their human rights? It is not my intent to discuss these questions in depth as examination of this kind adds no value to this thesis. The purpose behind presenting these questions is to demonstrate how the current asylum situation impacts on the people living in close proximity to the Channel Tunnel entranceways as well as impacting on the refugees themselves. This issue is further examined in the chapter that follows. The following analysis illustrates that impact the asylum seekers have had on the political arena and public resources.

7.9 Impact on local transportation facilities

It was unquestionable from the beginning that the Channel Tunnel would have a profound effect on the transportation facilities in Nord-Pas de Calais and Kent. This impact was not exclusive to these regions. This is illustrated by the fact that the Channel Tunnel has also impacted on the transportation facilities around the major centers that link these two regions and one of the less desirable consequences is that traffic volumes in Nord-Pas de Calais and Kent have increased (Fayman & Metge, 1995, 2). In light of this increase in demand, pressure was put on the respective governments to upgrade and extend existing roading facilities around the two Channel Tunnel entranceways. Under the Channel Tunnel Act the responsibility of roading maintenance and upgrading is assigned to the appropriate governments (Channel Tunnel Act, 1989, 1911). Because of the decentralisation of the two governments' upgrades, extensions of this nature became the responsibility of local councils.

The increase in demand for rail transportation networks around these regions heightened the need for local councils to upgrade the high speed railways link connecting to Nord-Pas de Calais and Kent. The driving force behind this need is that Nord-Pas de Calais and Kent have laid witness to increased levels of traffic volume generated through the "growth of cross-Channel traffic and of additional traffic attracted by the [Channel] Tunnel" (European Commission, 1996, 220).

Local councils assigned with the task of providing appropriate roading infrastructure and supplying high speed rail links have shown some response to the increase in demand. The British government has, however, been openly criticised for its lack of response and for not providing "properly planned transport infrastructure" (Essex & Gibb, 1994, 51). As a result, regions have

not been provided with the tools to “maximize potential benefits and minimise detrimental impacts” associated with the Channel Tunnel venture (Essex & Gibb, 1994, 51). Page suggests that the constrained response by central government reflects the absence of transportation orientated policies (Page, 1994, 6). One example that illustrates some response to the increase in demand is shown by the limited developments that have been made to the British high speed rail link, coined the Channel Tunnel Rail Link (CTRL)⁹.

The lack of adequate transportation infrastructure has become a frustrating issue for local residents and people crossing under the English Channel. An increasing number of travellers and business people use the Channel Tunnel. In line with this, visitation to Nord-Pas de Calais and Kent has risen dramatically. As numbers increase so do the demands on infrastructure. One impact that we can all empathise with is road congestion. The solution to this issue is for the respective governments to further mitigate this issue by upgrading existing infrastructure to accommodate the volume of people that demand transportation facilities on a daily basis.

7.10 Conclusion

In summary, the previous analysis has examined the major issues associated with the construction of the Channel Tunnel including, public opposition, environmental disturbance, water pollution, noise disturbance, energy consumption, water contamination, fire danger, asylum seekers and the increase in demand for transportation networks. All of these issues have come as a direct result of Channel Tunnel operations and were in part inevitable, although the magnitude of their impact depended upon the strategies implemented to mitigate them. Eurotunnel has been seen to have made an effort to recognise, manage and allay the impacts.

From an environmental standpoint Eurotunnel was made to take responsibility for the development. The environmental impacts that have arisen from the construction and operation of the Channel Tunnel have been mitigated in a manner that has been deemed satisfactory in relation to their statutory obligation. The standards are in compliance with the legal statutes governing the development and in accordance with the Channel Tunnel Act. In addition to this, Eurotunnel has consulted with environmental groups, interested parties and the general public in relation to the operational issues that have come to be associated with this venture.

⁹ Channel Tunnel Rail Link (CTRL) is the consortium that is responsible for operating and maintaining the high speed rail link (informally known as the tube) in and around Britain. This infrastructure links the Channel Tunnel entranceway on the British side. Since 1994, the British government has made a variety of adaptations to the high speed rail link CTRL around metropolitan London area. This has partially accommodated the increasing number of travellers that seek transportation after travelling through the Channel Tunnel. Although some adaptations to the existing rail have been made it has been suggested that this facility is still inadequate for the volume of travellers that demand services in and out of the Kent region.

The Channel Tunnel has had a direct effect on people's lives including, traffic congestion, noise disruption, security issues and fire concerns. All of these effects have been concentrated on people who live in and around Nord-Pas de Calais and Kent. While some of these issues were apparent throughout the construction phases of this project, the nature of these effects changed from the construction to the developmental phase. It is evident that Eurotunnel has to continue to address the concerns of the general public and seek to operate the Channel Tunnel in a socially and environmentally acceptable manner as required under the Channel Tunnel Act.

8.0 Economic impacts

Examining the economic impacts that have come as a result of the Channel Tunnel provides greater insight into the overall impact that this venture has had on the social spheres of Nord-Pas de Calais and Kent. This chapter identifies the challenges that occur when exploring the economic impact associated with a particular development. Further to this, the evaluation of economic impacts within the field of social and environmental impact assessment is demonstrated. This chapter also examines the relationship between regional development and transportation infrastructure. As part of this analysis, the regional responses shown by the French and British governments are also explored. The impact that this development was projected to have on employment is the next point considered.

The freight industry is a central discussion point of this chapter. The first part of this section identifies the impact that this development was projected to have had on the freight industries in Nord-Pas de Calais and Kent. This discussion extends to investigate the consequences that have arisen since the Channel Tunnel commenced operations. In addition, this chapter appraises the impact that the Channel Tunnel has had on the tourism industries in Nord-Pas de Calais and Kent. Tourism is considered separately because this industry remains a dominant economic force for the regions under examination. The final section of this chapter explores the impact that the Channel Tunnel has had on investment within the regions of Nord-Pas de Calais and Kent.

8.1 Background

Social and environmental assessments characteristically examine economic impacts at a regional and local level (Taylor *et al.*, 2004, 157). Identifying the direct economic impact of the Channel Tunnel on the residents of Sangatte and Folkestone is difficult, but identifying the widespread economic implications on Europe and Britain is an even more ambiguous process. In line with accepted practice, and the difficulties associated with determining the wider economic implications, this chapter focuses on investigating the economic implications that the Channel Tunnel has had on the local economies of Nord-Pas de Calais and Kent.

Data inconsistencies are another challenge faced when assessing the economic impacts associated with a venture. There are data inconsistencies apparent within the literature that records the actual dollar amounts of various components of the project. This fact is visible throughout a variety of literature that documents the total cost of the venture. It has been 'estimated' the Channel Tunnel came at a cost of £21 billion (European Commission, 1996, 77). Other sources suggest that the whole project came to a cost of around £10 billion (Eurotunnel, 1994, 1). It is indifferent to the following analysis which figure is correct or closest to the overall cost. The point to take from these figures is that the financial costs of this development were colossal in comparison to previously assembled international infrastructural developments. In recognition of these data inconsistencies, the actual dollar

amounts relating to various aspects of the Channel Tunnel are not extensively used throughout the following analysis.

In addition to data inconsistencies there are a number of limitations associated with the analysis of quantitative data. This means *ad hoc* assumptions have to be made about the actual impact that the Channel Tunnel has had on the regional economies of Nord-Pas de Calais, Kent and the European Union. In light of this, undertaking a study of *ex post* impacts is just as fraught as conducting an *ex ante* study of this development. This occurs because although “it is possible to document the changes which have happened since the opening of the [Channel] Tunnel ascribing these to the [Channel] Tunnel in a period which has seen many other changes in the economy is more difficult” (Hay *et al.*, 2004a, 1).

Significant changes within Europe and the UK include such things as the movement towards the Single European Market, intra-EU movement towards duty free sales, the collapse of the Berlin Wall in 1989 which opened the EU to Eastern Europe and the enlargement of the EU in 2004 (Hay *et al.*, 2004a, 1). In addition, changing transport policies, the privatisation of the rail network, the growth of affordable air travel and the Euro as a European currency have also all directly impacted on the economic structure of Nord-Pas de Calais and Kent. That said, it is difficult to separate the economic impacts that have come as a result of the Channel Tunnel from the economic impacts that have arisen as a result of events that have occurred within wider Europe and the UK.

8.2 Regional development and transportation infrastructure

The link between major transportation infrastructure and regional development has been debated (Vickerman, 1994, 9). In most cases these debates have centered on the relationship between economic performance, the level of competitiveness of a region and amendments made to transportation amenities (Vickerman, 1994, 9).

Throughout the design phase of the Channel Tunnel project, local councils looked to develop a greater understanding of the relationship between regional development and transportation infrastructure. It was extremely important that both regions placed some emphasis on understanding this relationship (Fayman & Metge, 1995, 2). One reason for this is because the better access a region has to markets and materials *ceteris paribus*³, the more competitive, productive and effective that region will be (Fayman & Metge, 1995, 2). In addition, regions that have efficient transportation systems find it easier to attain economic stability as opposed to regions that have inferior access to materials and markets (Fayman & Metge, 1995, 2).

³ *Ceteris paribus* is a Latin term that is commonly used within the field of economics. In essence it means “all things being equal or unchanged” (Google, 1). This means that market comparisons between components of the market can be compared without all other market factors having to be taken into consideration. This provides for basic market comparisons to be made as it is unfeasible to address all market variables when examining different markets.

The relationship between regional development and transportation infrastructure remains difficult to verify empirically (Fayman & Metge, 1995, 2). It is however, commonly accepted that there is a positive correlation between the transportation infrastructure endowment, interregional accessibility and economic indicators such as GDP⁴ per capita (Fayman & Metge, 1995, 2). That said, large scale transportation developments such as the Channel Tunnel have the potential to have a strong positive impact on regional development (Fayman & Metge, 1995, 2).

The two dominant discussions relating to the relationship between regional development and transportation infrastructure are in stark contrast to one another. One widely accepted theory suggests that this relationship contributes to polarisation while the other accepted argument claims that this connection results in decentralisation (Fayman & Metge, 1995, 2). In light of this, it has been mooted that regional policies that are established or adapted on the induction of new transportation infrastructures are not necessarily effective in reducing disparities (Fayman & Metge, 1995, 2). On the other hand, it is thought that there is a lack of evidence to support the idea that the reduction of regional barriers disadvantages peripheral regions (Fayman & Metge, 1995, 2).

In theory both of these viewpoints occur when a new transportation facility is established. When applying these ideas to the Channel Tunnel it becomes apparent that this new piece of infrastructure did make it easier for producers in Nord-Pas de Calais and Kent to move their products to larger regions. That said, these markets have however, been subject to competition from products originating in other regions. This has meant the markets in Nord-Pas de Calais and Kent that were once protected through a lack of adequate transportation facilities, have become endangered by market inputs from larger regions.

The government's regional responses to development did have an influence on the economic benefits that have been felt by Nord-Pas de Calais and Kent. The British government's response to date has focused around the regulatory structures needed to facilitate the development and operation of the Channel Tunnel. In retrospect, regional authorities should have placed a greater degree of emphasis on upgrading existing transport networks linking to the Folkestone and Sangatte terminals which would have helped ensure that the regions in question were able to maximise the economic benefits associated with the development (Essex & Gibb, 1994, 53).

The British regional response was in stark contrast to the response that was shown on the other side of the English Channel. On the French side, regional bodies achieved a greater degree of coordination between national and local policies as policy networks were extended from the centre to the periphery in a sequenced fashion (Essex & Gibb, 1994, 53). Hindsight shows the impact that the lack of regional transportation development had on Nord-Pas de

⁴ GDP stands for gross domestic product. This acronym refers to the total amount of goods and services produced within a region. The higher a region's GDP per capita the better their economy is believed to be.

Calais and Kent. This has meant that Nord-Pas de Calais and Kent have not gained the potential economic benefits that were predicted to happen as a result of this venture.

8.3 Impact on employment

It was anticipated that the economic benefits accrued from the Channel Tunnel would be two-fold. Firstly, residents believed that economic activity in Nord-Pas de Calais and Kent would be enhanced and secondly, high levels of unemployment within the two areas would decline (Officers of Devon Council *et al.*, 1989, 20). In addition to these regional benefits, early predictions suggested that the economic impacts of this venture would flow onto Britain, France and the wider European Union (Officers of Devon Council *et al.*, 1989, 20).

It can be assumed that the construction of any large scale infrastructural project will have a direct, positive, yet short term effect on employment. (Hay *et al.*, 1989, 2004b, 3). It was categorically assumed that between 1986 and 1994 the Channel Tunnel would promote employment in Kent and Nord-Pas de Calais. Employment issues were an important consideration for local residents and employment predictions directly contributed to the level of support that was shown for the project (Simmons, 1986, 14).

Employment predictions outlining the growth in employment proved to be attractive to local residents and businesses owners in the both regions. Forecasts predicted the peak construction period on the UK side would be during 1990 when Eurotunnel would require over 4,000 employees (Hay *et al.*, 2004b, 3). Predictions in France were more conservative as it was planned that the majority of the construction would be performed on British soil.

Statistics released validate that employment from the construction of the Channel Tunnel peaked in 1990 although, the actual impact was significantly smaller than earlier anticipated (Hay *et al.*, 2004b, 3). Over 8,300 workers are recorded to have been involved with constructing the Channel Tunnel in Kent between 1986 and 1994 (European Commission, 1996, 77). Further to this 1,827 people were employed at the peak of employment in 1990 on sub-contracts in the UK (Hay *et al.*, 2004b, 3). Of this total, 35% of employees were sourced from within Kent (Hay *et al.*, 2004b, 3). A further 3,000 people came from Ireland (European Commission, 1996, 77). Although the Irish do appear to contribute to a large proportion of this total workforce, local based employment was higher than developers had originally predicted (European Commission, 1996, 77). Nord-Pas de Calais, however, reaped a more direct benefit from the development. Of the 5,114 jobs that are recorded to have been established as a result of the construction of the project in Nord-Pas de Calais, 90% of the total workforce were recruited from the local labour market (European Commission, 1996, 77).

One employment issue during the construction and operation of the Channel Tunnel was, and is, skill shortages. During the construction phase there were staff shortages within the fields of engineering, maintenance, administrative,

clerical, catering, cleaning and sales (Channel Tunnel Working Group, 1989, 6). As a result, Eurotunnel recruited employees from outside Nord-Pas de Calais and Kent because a large number of the specialists needed for construction could not be sourced from the local labour markets (Hay *et al.*, 2004b, 3).

Since the construction phase the Channel Tunnel has continued to generate employment. Eurotunnel currently employs a substantial labour force to manage and operate the running of the Channel Tunnel. Employees include engineers, mechanics, electricians, ticket staff, administration staff and security guards. In total there were 3,309 people employed by Eurotunnel on fixed and long term contracts in 2003 (Eurotunnel, 2003b, 1). Of this total workforce, 1,946 staff were employed at the Coquelles terminal and 1,357 staff worked at the Folkestone terminal (Eurotunnel, 2003b, 1). It is important to recognise that a number of people contract their services to Eurotunnel are excluded from this figure. For example, sub-contractors who hire their services to Eurotunnel are classified in labour market statistics as being self employed. Recognising this demonstrates that Eurotunnel employed over and above the 3,309 employees as illustrated by their 2003 employment statistics.

Although employment rose during the construction period, the Channel Tunnel did not have the significant impact on employment as earlier predicted. A generally accepted characteristic of the construction labour force is that they are migrant. In accordance with this, British construction workers have moved on to work further afield since the Channel Tunnel was completed (Laing, 1995, 71). France has proved to be the exception to this rule. Literature indicates that a large proportion of the workforce employed during the construction of the project still reside in Nord-Pas de Calais (Laing, 1995, 71). These people have since found alternative work, often in other industry related jobs.

8.4 The impact on the ferrying industries in Nord-Pas de Calais and Kent

It was projected that this facility would have two main consequences for the ferry industries in Nord-Pas de Calais and Kent. Firstly, it was forecasted that there would be a direct impact felt through the conversion of freight and passenger traffic (European Commission, 1996, 79). Secondly, it was anticipated that the changes in freight and transportation flows would have an indirect impact on port employment (European Commission, 1996, 79). Studies predicted the loss in ferry related employment to be around 7,400 and 7,480 jobs for Kent ports (Hay *et al.*, 2004a, 13). Further forecasts projected that the Channel Tunnel would promote between 1,500 and 2,000 jobs from Channel Tunnel operations in the UK. These figures combined resulted in a predicted loss of between 5,980 and 5,480 jobs in the Kent region.

One accepted theory proposed that this development would change the nature of the freight and passenger markets in Nord-pas de Calais and Kent. Price competition was a major concern identified early on in the development phases of this venture. It was suggested that the Channel Tunnel proposal

might result in a price war between ferry companies and Eurotunnel (The Royal Town Planning Institute, 1990, 23). It was claimed that this might eventually drive one of these services out of business leaving the remaining supplier with the market monopoly⁵ (The Royal Town Planning Institute, 1990, 23).

Vickerman and Flowerdew rebutted this argument claiming that three factors would prevent a monopolised market situation occurring. Firstly, the Channel Tunnel was not projected to influence markets outside the immediate sphere of the Channel Tunnel entranceways (The Royal Town Planning Institute, 1990, 23). This fact alone would prevent Eurotunnel from obtaining market domination. In addition, “whilst the ferries themselves could readily be transferred away from the short sea crossings if...operation[s] ceased to be profitable, they could equally readily be brought back if the [Channel] Tunnel tried to exploit a local monopoly” (The Royal Town Planning Institute, 1990, 23). Furthermore, it was anticipated that the Channel Tunnel would have reasonably low margins and operation costs. This meant that should the Eurotunnel consortium enter into financial hard times, the rights to operate the structure could easily be sold to another operator (The Royal Town Planning Institute, 1990, 23). This situation would act as a buffer to ensure that the ferry companies themselves did not acquire the monopoly.

Since the Channel Tunnel commenced operations in 1994, a considerable amount of interest has been paid to the actual impact that the Channel Tunnel has had on the ferry industry in Nord-Pas de Calais and Kent. This development has transformed that nature of the freight industries in northern France and southern Britain. Furthermore, the transference of freight transportation has had a direct impact on employment. In Britain researchers have identified that tunnel traffic was “partially pulled away from Kent and Nord-Pas de Calais ports”, yet the “net balance of traffic flows into and out of these regions was overwhelmingly positive” (European Commission, 1996, 76). The majority of the traffic that the Channel Tunnel has taken was once secured by the ferry industry (European Commission, 1996, 76).

Since operations commenced in 1994 the market share held by the ports on both sides of the English Channel have continued to diminish (Hay *et al.*, 2004a, 23). On the British side by 1999 Eurotunnel had redistributed 25% of freight traffic that had once gone through ports to their rail system (Hay *et al.*, 2004a, 23). In addition to freight transportation, Eurotunnel secured a significant proportion of the passenger flows that the port sector had once secured. As a result the market share of passenger transportation fell continuously from 1994 onwards on both sides on the English Channel (Hay *et al.*, 2004a, 23).

⁵ Within the field of economics the term monopoly describes when an entity is the sole supply of a particular commodity and as a result they have the power and discretion to determine the market price. Price fixing of this nature means that companies are not subject to pressure from normal market forces and entities in this position are given the opportunity to exploit customers.

Figure 8.4.1 Share of road goods vehicles between Britain and Continental Europe by port group

	%share						
	1993	1994	1995	1996	1997	1998	1999
Channel Tunnel		2	12	15	7	17	19
Dover Strait ferries	47	46	39	37	46	39	40
North Sea ferry routes	41	40	37	36	37	35	34
English Channel ferry routes	12	12	12	12	10	9	7

(Hay *et al.*, 2004a, 28).

The table above illustrates the percentage of the market share of road goods vehicles that the Channel Tunnel, Dover Strait ferries, North Sea ferry routes and English Channel ferry routes held from 1993 to 1999. The declining rates above were also accompanied by a general decline in other port routes and the absolute number of vehicles carries through each route also deteriorated (Hay *et al.*, 2004a, 28).

The ferry industry has also been directly affected by a reduction in passenger flows. Between 1985 and 1995, the passenger numbers of travellers using ferries steadily decreased (Hay *et al.*, 2004a, 33). On the British side, ports recorded almost 24 million passengers used their services in 1997. This decreased by 14% in 1998 and numbers continued to decline until 2001 (Hay *et al.*, 2004a, 33).

It is important to recognise that the changes shown above could have, in part, come as a result of other economic changes within wider Europe during the 1990's. For example, in 1992 the Ecofin Council set the date for abolition of intra-EU duty-free sales to be the June 30, 1999 (Union Franceileene Contre les Nuisances Aerriennes, 2). Duty-frees were actually meant to be abolished with the coming of the SEM in 1993, but a number of EU member states, led by Britain, managed to win a six-year reprieve which meant that duty-free sales were eventually abolished in 1999 (Union Franceileene Contre les Nuisances Aerriennes, 2).

Wider EU changes did directly affect the ferry industries in France and Britain however, for the purposes of this research the impact of external factors such as this will not be extensively examined. The main point to recognise here is that there were other important changes that occurred within the EU during the 1990s that had an affect on the ferry industry. This invariably means that assessing the exact impact the Channel Tunnel had on the ferry industries in France and Britain is problematic. That said, it is undisputable that the reduction in passenger and goods vehicles using the ferry services which has resulted in a loss of income for these service providers can in part, be attributed to Channel Tunnel operations. The economic components of this market restructuring could pertain to a thesis in itself, so for the purposes of this analysis employment is the only impact on the ferry industry that will be appraised.

One of the first areas reviewed when a company is looking to increase efficiency is employment. In turn, one of the quickest and most effective ways to reduce costs and raise profits is to reduce labour. Unemployment affects people in a number of ways. Given that port employees are often unskilled workers, their employment options are often limited. In light of this, many people made redundant may not be able to find alternative employment and if they do, in many instances employment in a new position may not be immediate. People in this position often end up taking up precarious employment which affects all aspects of their families lives. Loss of income invariably means that families are subjected to extremely hard times.

8.5 Changes in tourism

Europeans have always had the ability to cross frontiers with relative ease because of the geographical layout of the European continent. These circumstances were further facilitated by the advent of the fixed rail link which allowed for greater ease of travel between Europe and the UK. London and Paris have been locations that have attracted large volumes of tourists for generations. *Ex ante* studies demonstrated that tourism was one of the principal sectors that would be affected by the existence of the Channel Tunnel and associated infrastructure (Hay *et al.*, 2004b, 3). It was anticipated that this development would create significant opportunities for tourism and in turn increase tourism employment and allow for the strengthening of the tourist industries in Nord-Pas de Calais and Kent. The strengthening of the tourism industry was dependent on that fact that external visitors would stop over whilst en route to, or from, the Channel Ports and the Channel Tunnel. This development has intensified visitation and ease of travel to these tourist locations.

The Channel Tunnel extended road and rail networks, redistributing tourist flows away from traditional transportation routes and destinations (Fayman & Metge, 1995, 10). It was thought that the Channel Tunnel would provide a platform for the strengthening of the tourist industries in Nord-Pas de Calais and Kent. Local government bodies needed to ensure that marketing strategies were tailored to allow for their tourism industries to be bolstered through increased visitation to these areas. Successful tourism development for both these areas remained heavily reliant on new regional policies (European Commission, 1996, 85).

Both regions looked to implement systems to promote Nord-Pas de Calais and Kent as travel destinations rather than stopovers. Firstly, the Channel Tunnel was recognised as a resource that could be used to promote these two regions as tourist locations for international travellers and secondly, there were new found opportunities for the British and French to travel across the English Channel on brief trips (Bruyelle & Thomas, 1994, 95). It was projected that the increases in traffic flow would act as a catalyst for economic growth for Nord-Pas de Calais and Kent.

Incoming car based tourism was seen to be an instrument that would provide financial benefits for both regions. One of the initial benefits of the Channel Tunnel experienced in Nord-Pas de Calais and Kent came through tourism in 1987 (Bruyelle & Thomas, 1994, 95). Since the Channel Tunnel opened for operation in 1994, Kent and Nord-Pas de Calais have experienced an increase in tourist numbers. Over 500,000 travelers visit the French terminal per annum, while the British site receives this and more (European Commission, 1996, 2). Figures reveal that there were approximately 203,000 day trips from Europe to Kent with a further 405,000 incoming trips generated from within the UK (Hay *et al.*, 2004b, 3). While these figures appear considerable there is no direct evidence on how many UK residents choose to travel to Kent to make short trips via the Channel Tunnel. Early forecasts had predicted there would be approximately 203,000 day trips from Europe to Kent with a further 405,000 incoming trips from within Britain generated (Hay *et al.*, 2004b, 3). That said, it cannot be disputed that the Channel Tunnel has increased tourism visitation and stopovers at these two regions. Economic benefits associated with this include, increased demand for commodities such as food, increased foreign spending and heightened demand for tourist services, retail and accommodation facilities.

8.6 Investment

With new found interest in Nord-Pas de Calais and Kent, land prices were directly affected. One of the principal theories of economics asserts that as demand rises, so too does price. This theory applies to all economic goods. In relation to land value this means that the greater the demand for land and dwellings the higher the market price that is paid for these two goods.

New found interest in Dover and Nord-Pas de Calais meant that the demand for land and dwellings rose. Construction workers, investors and consultants were some of the people who required facilities in and around these regions. Much of the work force employed during the construction of the Channel Tunnel was housed locally (Laing, 1995, 71). This inflated house prices and boosted revenue for local accommodation facilities. While in the short term demand inflates prices, market prices do plateau over time. This meant that although prices rose exponentially during the planning and construction phases of the development, this trend has since dissipated.

A region's locality plays an important role in how attractive an area is to invest in. In the instance of the Channel Tunnel the industrial location of Nord-Pas de Calais and Kent meant that these areas were attractive to investors. Both prior to, and during, the construction phase considerable interest was shown by property developers looking to make capital gains on investments in these two areas. Investors projected that the surrounding areas would be regenerated by the Channel Tunnel development. Investment interest in this area came from an assortment of people from all corners of the globe.

Interest from the United States has dominated foreign investment in Nord-Pas de Calais and Kent (Collier, 2001, 5). There has also been an increase in British investment in France and vice versa. In 2001, French firms accounted for around 11% of foreign investment stock in Kent, employing over 3,000 employees while United States investors held 30% of total foreign stock (Collier, 2001, 7). Collier suggests that the Channel Tunnel has enabled Britain and France to enter into neighboring markets via cross border investment (Collier, 2001, 7). Such activity denotes the way in which “border regions.....act as staging posts for mobile factors and thus have to recognise the need for continuing activity to attract new firms and retain existing ones” (Collier, 2001, 7).

The impact of increasing interest in investment in Nord-Pas de Calais and Kent has been twofold. Firstly, increasing demand in dwellings and land meant that prices increased. In accordance with this, it became more expensive for local residents to purchase property. Secondly, the flip side of this is that people selling properties within these two regions received greater capital gains for their amenities and land. This effect was concentrated on properties that were not in the immediate vicinity of the Channel Tunnel entranceways or placed along the main arterial routes linking to the London railway system. Properties in these positions often diminished in value because of the detrimental impact associated with the construction and operation of this new piece of infrastructure. Noise disturbance is one example of an impact that negatively affected the price of land and amenities in and around the Channel Tunnel terminals.

8.7 Conclusion

Social and Environmental Assessments characteristically examine economic impacts at a regional and local level. Data inconsistencies and evaluating qualitative data are two challenges relevant to assessing the economic impacts associated with a particular venture. It was important that region understood the relationship between transportation infrastructure and regional development. One reason for this is because it is thought that the better access a region has to the locations of input markets and materials *ceteris paribus*, the more competitive, productive and effective the region will be (Fayman & Metge, 1995, 2).

Employment was one area in which the impact of the Channel Tunnel cannot be disputed. It was projected that the Channel Tunnel would have a positive impact on employment within these two regions. Employment figures illustrate that during the construction phase Eurotunnel employed over 5,600 employees and in 2003, employed 3,309 individuals to manage and operate the Channel Tunnel. These figures demonstrate the level of employment that was, and is, currently generated through the operation of this development.

Tourism is another aspect of the economy that has been directly affected. As tourism visitation increases, regions receive greater economic benefits. Positive impacts associated with the development of this industry include an increase in demand of tourist facilities, consumer products and tourist

services. Foreign investment in this area was another economic indicator that changed as a result of this development. Furthermore, the Channel Tunnel development increased the price of land and dwellings which had both negative and positive outcomes for locals.

On the whole the Channel Tunnel has been an instrument that has had a profound impact on the economic dimensions of Nord-Pas de Calais and Kent and it is currently a useful piece of infrastructure that can be exploited to help promote economic growth in these two regions.

9.0 The impact of the Channel Tunnel on the European Union

This chapter examines the impact that the Channel Tunnel has had on the European Union since operations commenced in 1994. The relationship between the Channel Tunnel and the European Union is the first point discussed in this chapter. Following this, the impact that this development has had, and continues to have, on the transportation networks in and around Europe is examined.

The impact that asylum seekers are having on countries within the EU is the next point considered. The effect that this issue has had, and continues to have, on freight companies is discussed in this analysis. Furthermore, the systems implemented to help alleviate this issue are acknowledged, along with notes provided on the impact that this issue has had on the political arena. The final section of this chapter explores the impact that the Channel Tunnel has had on economic dimensions the EU.

This chapter identifies the widespread impacts that have been associated with the Channel Tunnel development. While issues are commonly examined from a local and regional perspective, there is also value in examining the effects that issues have on people nationally and internationally. In accordance with this, this section discusses the impact that the Channel Tunnel has had, and continues to have, on people living in areas outside the immediate vicinity of the Channel Tunnel's entranceways.

9.1 The Channel Tunnel and the European Union

Despite the volume of literature written on the Channel Tunnel development, a number of important issues are virtually invisible throughout these works. While regional impacts are often discussed, until recently there had been little or no emphasis placed on the impact that the Channel Tunnel has had on the European Union. Prior to the Channel Tunnel opening, "supporters and critics of the scheme have been insistent that it [would be] inextricably involved in the economic, political, social and psychological integration of Europe, and notably with British relations" with the European Union (Church, 1989, 2). This idea is discussed further throughout this chapter.

While there has been a lack of literature produced on the relationship between the Channel Tunnel and the EU, member states recognised from the early stages of the development that the Channel Tunnel would have an impact on areas far outside the boundaries of Britain and France. The European Parliament released a statement predicting that "a fixed transportation link across the English Channel will stimulate, facilitate passenger and goods traffic...generating positive direct and indirect effects...not only between the United Kingdom and France but also with other Member States of the Community" (TED Case Studies, 2). The EU's involvement in this development has become a subject of major debate. Some believe that support for the Channel Tunnel was partially generated because the European Union was seen to be in favour of constructing a fixture to bridge

the English Channel. Although the EU did display a supportive demeanour towards a development of this nature, there is no direct evidence to suggest that the interests of the EU were, or have been, addressed at any stage throughout the selection, development, construction or operation of this development.

The European Union has unified Europe in a number of ways. The Single European Market (SEM)⁶ came into effect on 1 January 1993 (Encyclopaedia, 1). This market has been an influential unification tool for the EU. The Channel Tunnel has also played a historic role in undermining one of the more influential barriers that once so strongly divided the European Union. In doing this, the Channel Tunnel has ended Britain's insular seclusion, turning the 'megapolis London Milan' from myth to reality and making the British Isles an authentic part of the European continent (Fayman & Metge, 1995, 1).

The impact that the Channel Tunnel has had on European integration is one interesting debate that has emerged since the Channel Tunnel commenced operations in 1994. Through providing cross border transportation, the Channel Tunnel has facilitated cultural understanding between Britain and Europe. As demonstrated earlier in this thesis, there was a considerable level of scepticism displayed by the British towards the French throughout the initial stages of this development. Although it is challenging to determine the level of scepticism that still exists, it has been argued, that the Channel Tunnel has brought forward a "greater awareness of shared culture, history and interests" (Church, 1989, 6).

While it is clear how greater cultural understanding affects the 'individual', when psychological changes are made within a person they often end up modifying their behaviour (Church, 1989, 6). This impact is then transferred as people behave and respond differently towards people, issues and ideas because they have greater level of cultural understanding. Greater cultural understanding has helped augment the bond between Britain and Europe which has, in turn, strengthened the European Union.

The Channel Tunnel has also had a significant impact on the political arena. This is disposed by the fact that the French and British governments welded closer political ties as a result of bi-national consultation that occurred throughout the developmental stages of the Channel Tunnel. Church reiterates this point, suggesting that as contact grows and trips to Britain are made easier, passenger traffic grows, and in turn, as visitation increased so would the level of mutual understanding and contact between Britain and Europe (Church, 1989, 8). Recognising that the Channel Tunnel has had some impact on the European Union further demonstrates how this development has had an impact on areas far beyond the boundaries of the regions adjacent to the Channel Tunnel entranceways. It is difficult to unravel

⁶ Single European Market (SEM) contract was constructed by policy makers throughout the European Union in an attempt to facilitate the "process of European economic integration, involving the removal of obstacles to the free movement of goods, services, people, and capital between member states of the EC" (Encyclopaedia, 1). Some of the major aspects it covers, among other benefits include the "elimination of customs barriers, the liberalization of capital movements, the opening of public procurement markets and the mutual recognition of professional qualifications" (Encyclopaedia, 1).

the extent of the impact that the Channel Tunnel has had on the political arena, although it is impossible to ignore that this development has played a part in politics, both prior to its establishment and thereafter.

While the assumptions made above are somewhat speculative and rhetorical in nature, it has to be acknowledged that this development has had some influence on European integration and the on political arena within Europe and Britain. These impacts have in turn raised a number of valuable questions. As social perceptions change so does individual behaviour. The Channel Tunnel has bridged a physical and cultural barrier. If cultural appreciation can facilitate unification, then the more the British and French understand about one another the more unified Europe becomes. In line with this, it can be argued that the Channel Tunnel has played an important role in worldwide politics as it provided a stage to unite two countries. Church suggests that, the Channel Tunnel has cemented “European Political Co-Operation, and chang[ed] the way others see Europe” (Church, 1989, 6). This in turn has helped to dissipate the age old trepidation that once so strongly divided these two countries.

9.3 Transportation

The Channel Tunnel has also had a positive and significant impact on the EU's transportation networks. The Channel Tunnel currently provides for ease of passenger travel and freight transportation in and around the EU. Transportation is a chief priority for policy makers in Europe and Britain. The Transport White Paper and Second Railway Package produced by the European Commission identifies growth in rail freight and international freight as being matters of considerable concern (English Welsh *et al.*, 2002, 3). The Channel Tunnel was not only seen as a mechanism to increase the speed and reliability of transportation between Britain, France and Europe, but it is also regarded as having made a considerable contribution to European infrastructure, by being a “*maillon manquant, maillon structurant de l'ECrope des transports*”⁷ (Church, 1989, 6).

The idea of establishing an efficient high speed rail link throughout the EU came to the fore towards the end of the twentieth century. The idea was to provide a “high speed rail link between all the major continental metropolitan areas” in Europe (Vickerman, 1994, 13). The effect that the Channel Tunnel has had on European transportation flows is the result of a combination of interlinking influences (Fayman & Metge, 1995, 8). That said, the Channel Tunnel cannot merely be seen as an isolated piece of infrastructure, but rather, as an integral part of European transportation infrastructure (Fayman & Metge, 1995, 8).

The Channel Tunnel has also had an indirect influence on the way environmental and social concerns are addressed and mitigated within the EU. Since the 1980s, a large number of high speed transportation networks

⁷ The translation of this quote is “missing link, formative link of the transport system in Europe” (Church, 1989, 6).

within Europe have been improved. As a result of these upgrades, high speed transportation links now connect all the major centres of the European Union. The Channel Tunnel has proved to be a useful case study for developers involved in upgrading these systems. Although the construction and operational impacts that come as a result of upgrading existing transportation infrastructure were not as intense as in the Channel Tunnel example, many of the social and environmental implications were similar in nature. Developers have been able to use the Channel Tunnel development as an example which has helped them to identify mitigation strategies to employ to alleviate the social and environmental issues that came as a result of their large scale infrastructural developments.

The Channel Tunnel has heightened the demand for adequate transportation links in France and Britain. The EU had recognised this and established a Trans-European Transport Network policy that provides funding for transportation projects that will be of benefit within the EU (Europa, 1). It is thought that these policies support the “implementation and development of the internal market, as well as re-enforcing economic and social cohesion” while assisting “economic competitiveness and a balanced and sustainable developed European Union (Europa, 1).

Growing demand has spurred the need for more efficient transportation networks. It is interesting that the high speed transportation links on the European side of the Channel Tunnel have been developed considerably faster than in Great Britain. For example, Europe has two excellent high speed links that connect from the Channel Tunnel Rail Link to Brussels and Paris. On the British side, the links that connect the Channel Tunnel to metropolitan London have in parts been upgraded, although British Rail has not approved plans to upgrade the entire railway link, as was done within Europe (Grayson, 1990, 61). The increase in demand and the subsequent lack of adequate transportation infrastructure has directly affected travellers and local residents. An example of one issue that has come as a result of this as identified in Chapter Seven is road congestion which has sparked traffic delays in and around Kent.

Such lack of development could in part be attributed to the lack of trust apparent between the British and French. Although this may be circumstantial, it is not absurd to think that some parts of Britain may want to maintain their British character. The Channel Tunnel has destroyed not only a geological barrier between France and Britain, but it has also infiltrated the psychological barrier that once so strongly divided these two nations. After the development of the Channel Tunnel, many may have seen the development of the high speed link as another move that would bring them both geographically and psychologically closer to their European neighbours.

9.4 Asylum seekers

As demonstrated in Chapter Seven, asylum seekers have had an immense impact within France and Britain. The impact of this issue has also been felt within the wider EU. As discussed earlier the installment of security equipment, additional immigration personal, changes to immigration policy, damage to freight and political conflict have all surfaced as a result of asylum seekers. The political impact of asylum seekers is best seen through the way that this issue demands an EU level rather than a national level solution.

The asylum problem will continue until the parties with power are able to identify effective strategies to mitigate the impacts associated with this issue. That said, EU member states have to some extent recognised the importance of the issues that have come as a result of the Sangatte refugee situation. This is illustrated by the fact that member states have met to confer about the notion of strengthening measures to combat and prosecute asylum seekers throughout the EU (Tyler, 2001, 1). In addition, the British Home Secretary and the French Interior Minister have publicly called for swifter “progress to agree and implement common EU procedures for dealing with asylum seekers” to help inhibit “asylum shopping” (Tyler, 2001, 1).

The asylum situation has heightened the need for the EU to engage with member states to adopt legislation that will make someone legally responsible for the situation in Sangatte. This is an ongoing challenge amplified by the fact that the Schengen Agreement (1985) and the Schengen Convention (1990) established areas within the European Union without internal borders (European Council on refugees and Exiles, 1). It is thought however, that as a corollary to the removal of internal borders, the Schengen system has harmonised and strengthened the enforcement of external border controls within individual countries (European Council on refugees and Exiles, 1). The Schengen system has allowed for the freedom of movement of people within the EU. The "Schengen Area" which once included five Member States, grew to include 13 Member States in 1997, however, interestingly Britain is not party to the Schengen agreement (European Council on refugees and Exiles, 1). As a result, British border controls remain fully operational through the Channel Tunnel and within British airports. This in turn, has meant that the EU's, SEM is not yet fully operational.

Although the impacts of asylum seekers have been, and still are, predominantly felt within France, the issue of asylum seeking is a European problem that is in desperate need of being addressed. The EU has displayed some form of response to this issue in that they have “resolved to create a Common Asylum System throughout Europe” although, this as yet, has had no notable impact on the current refugee situation (Craig, 2002, 492).

Although the asylum question has been a seed of conflict between France and Britain, these countries have made some form of a collaborate approach towards addressing the issue. A number of changes have been made to public policies in response to this problem, although the adaptations to

existing policies have not significantly changed the nature or impacts associated with this issue.

Keeping in mind that Britain is not party to the Schengen system, in early 2004, the Home Secretary and the French Interior Minister met and decided that all individuals travelling from Calais to Dunkirk would be subject to immigration checks as of 1 February 2004 (Craig, 2002, 1). This means that people with the incorrect documentation are refused permission to enter the UK. This agreement is reciprocal which means that the French authorities can check travellers at Kent and UK immigration officials also have the authority to do so in Nord-Pas de Calais (Craig, 2002, 3).

The Channel Tunnel has played an instrumental role in facilitating the shift of freight transportation from road to rail. However, the current problems associated with asylum seekers are jeopardising the long term viability of this shift in transportation mode. Asylum seekers have been of major concern to freight transporters. English Welsh Scottish Railway, Britain's largest rail freight operator complained directly to the European Parliament's Petition Committee about the Sangatte refugee situation (Craig, 2002, 3). This company explained that they were enduring financial losses because of delays in freight trains travelling through the Channel Tunnel (Craig, 2002, 3). Added expenses associated with routine business operations are characteristically passed on to the consumer. This means, that over time, the price of goods and service rises to accommodate for the additional costs imposed on transportation companies. English Welsh Scottish Railway believes that France is in breach of EU law as they are not ensuring the "free movement of goods" (Craig, 2002, 3). Concerns relating to asylum seekers such as this have spurred much debate and ill feeling between Britain, France, Eurotunnel and the wider European Union.

While France and Britain have extensive and encompassing immigration policies, there has been no specific response made to the asylum problem in France. On the contrary, policy instruments, such as visas, have been used to mitigate this issue. Such systems have been employed in an attempt to prevent asylum seekers from crossing European borders without the correct paperwork. This method of deterrence has had no significant impact on the current situation and refugees are still arriving in droves at Sangatte.

Within Europe the restrictive measures of the Schengen Agreement has serious implications for asylum seekers, particularly the requirement that signatory states fine carriers who transport refugees into the Schengen Area without proper documentation (European Council on refugees and Exiles, 1). It has been suggested, that policies such as this have not helped the problem of asylum seekers but instead, criminalised the migrants and heightened the demand for illegal smuggling networks (Guiraudon, 2002, 4). While visas may have enhanced the demand for smuggling networks, the most concerning impact of the current policies is that they criminalise refugees.

Although the effects of this issue have been predominantly felt by those living in close proximity to the Channel Tunnel entranceways, asylum seekers are

having a significant impact on people who live outside of Nord-Pas de Calais and Kent. One example of the widespread impact of asylum seeking is discernible when examining public funding. The French and British governments have a restricted pool of money available to fund public services. Immigration controls are one example of a government funded service. These controls come at a considerable financial cost to the respective governments. When governments have to increase funding in one area, it means that there is less money available to allocate to other parts of the economy that require public funding. For example, the more money required to provide sufficient immigration services, the less money available for services such as housing, health care and education. This illustrates how the asylum problem impacts on public resources and the lives of people living outside the areas adjacent to the Channel Tunnel entrances.

9.5 Impact on trade and travel in the European Union

As demonstrated in Chapter Eight, the Channel Tunnel has had a direct and indirect impact on the economic dimensions of Nord Pas de Calais and Kent. Furthermore, the economic impacts of this development do transcend far beyond the boundaries of these two regions. Britain, France and the wider European Union have all been affected by this piece of infrastructure. Widespread economic impacts were predicted from the initial stages of the development. This is exposed by the fact that during a franchise award speech made to Eurotunnel, the Secretary of State for Transport Rt. Hon. John MacGregor announced that the "link in operation will bring direct benefits....these benefits can be expected to increase the level of UK's trade with continental Europe and contribute to economic growth and employment throughout the UK" (Gibb & Dundon-Smith, 1994, 179).

While this facility has provided easy access to goods and services for producers and consumers, it has also proved itself to be a cost effective means of freight transportation. The EU has consistently worked towards bridging the barriers that have hindered trade transportation between EU member states. The Channel Tunnel has played a significant role in facilitating the movement towards achieving a single integrated European market, which has been a long term policy focus for the EU. Establishing an integrated market would facilitate the flow of goods and services within the EU and Britain. In line with this, the Channel Tunnel has been seen as "an important element of the implementation of the major European policy for promoting the development of economic and cultural activities throughout the community," while it has helped towards creating "a single, integrated market and a people's Europe" (Officers of Devon Council *et al.*, 1989, 22).

Another industry in which the Channel Tunnel has had a significant impact on is transport. The Channel Tunnel has provided a transportation alternative for travellers and commuters. It is a time and cost effective means of transport that has facilitated the ease of travel between the UK and Europe (Fayman & Metge, 1995, 2). Prior to the establishment of the Channel Tunnel, the journey from Paris to London took around eight hours (Fayman & Metge, 1995, 2). Much of this time was consumed by the ferry crossing and waiting in ferry

terminals for ferries to be loaded. In 2001, figures released illustrated that the time of travelling from London to Paris has been halved from eight to four hours (Fayman & Metge, 1995, 2). The isochrones highlight the impact that the establishment of the high speed rail link and the Channel Tunnel has had for travellers. This time reduction does however, primarily benefit those who choose to travel by rail as time reductions for those commuting by car has been minimal. Another significant benefit of the Channel Tunnel is that it provides all weather transportation. As identified earlier, the English Channel is plagued by unpredictable weather. The Channel Tunnel means that travellers are no longer delayed due to difficult weather conditions.

9.6 Conclusion

The Channel Tunnel has had a direct impact on not only Nord-Pas de Calais and Kent, but the impacts of this venture have also been felt within the EU. Towards the end of last century, the European Union began to play a more important role in international politics. The Single European Market is one system established by the European Union to promote European integration. The Channel Tunnel has also helped to unify the EU as it has had a psychological impact on people living in the UK and Europe. This is illustrated by the fact that the Channel Tunnel had brought a greater level of cultural understanding between the French and British. In addition, France and Britain have welded closer political ties as a result of binational consultation. The Channel Tunnel has also had a considerable impact on freight and passenger transportation, further facilitating the ease of transporting products and people around the EU.

The asylum situation in Sangatte is an issue that has come as a direct result of Channel Tunnel operations. This issue is affecting the whole of the EU in some way. It has been suggested that the asylum situation in northern France is having a major impact on public funding. Although Britain is increasingly concerned about the number of refugees reaching British soil, they perceive the issue to be France's responsibility. Some have suggested that the refugee problem is a European problem and should be addressed by EU member states. Whatever the case, there is a need for the parties concerned to take responsibility for this problem and begin working collectively to develop effective strategies to mitigate this issue.

The economic impacts of the Channel Tunnel have reached far beyond the boundaries of France and Britain. Although economic impacts are difficult to pinpoint, it has to be recognised that the Channel Tunnel has proved itself to be an affordable trade and travel alternative for people travelling and transporting goods between the Britain and Europe. There is a need for the EU to play some part in developing solutions to the issues that have come to be associated with this development. This is fuelled by the fact that although the dominant impacts of these issues have been concentrated on areas within France and Britain, the flow on effect has meant that countries and people all over Europe have been, and are currently being, affected by the operation of the Channel Tunnel.

10.0 Conclusion

This thesis has examined the social and environmental impacts that have come as a result of the Channel Tunnel development. In doing this, this research identifies how this development has impacted and continues to have an impact on the social, political and environmental contexts of Nord-Pas de Calais, Kent, France, Britain and the EU. The background of the idea to bridging the English Channel is discussed in this chapter. Following this, the main points identified in the examination of the legislative background and the social, economic and political contexts of Nord-Pas de Calais and Kent are outlined.

The next section of this chapter presents the significant construction impacts that were found to have arisen as a result of the Channel Tunnel development. Furthermore, the impacts that have come as a result of Channel Tunnel operations are summarised. Notes are then provided on how the impacts from the construction and operational phases of the development of the Channel Tunnel affected people in Nord-Pas de Calais and Kent. In addition, the methods that were seen to be employed by Eurotunnel in an attempt to address these issues are identified. The significant economic impacts that were found to be associated with the Channel Tunnel development is the next point outlined. The impact that the Channel Tunnel was found to have had on the European Union is also considered. The final sections of this summary chapter identify the limitations of this study, challenges associated with data collection and the value of this piece of research.

10.1 Summary

The idea of building a fixed transportation link connecting Britain with Europe dates back centuries. Chapter Two found that political uncertainty and a perceived threat to security were two significant factors that prevented this idea from coming to fruition before the twentieth century. A long period of European peace and closer bi-national relations between the British and French helped to reunite these two nations. This context set the scene for British Prime Minister Margaret Thatcher and the French President Francois Mitterrand to meet, discuss and eventually commit to proceed with constructing a fixture to physically bridge the two continents.

The English Channel or the *La Manche* is the part of the Atlantic Ocean that separates Britain from Northern France (Dictionaries, 1). This stretch of ocean was the area the Channel Tunnel venture was designed to cross. The groups of people predominantly affected by this venture lived in Nord-Pas de Calais and Kent. This occurred because these areas would come to house the Channel Tunnel terminals.

The analysis from Chapter Three identified that the Act of Canterbury 1986 and the Channel Tunnel Act 1987 were the two pieces of legislation that played a prominent role in the planning, development, construction of the Channel Tunnel. In addition, these two pieces of legislation still play an important role in the current operation of this development. Under the legislative framework people who were concerned about aspects of the Channel Tunnel were able to voice their concern against the proposal to the selection committee providing that they could prove *locus standi*. This thesis suggests that the concerns of local residents were not necessarily adequately addressed throughout the planning, construction or subsequent operation of the Channel Tunnel.

The discussion in Chapter Four demonstrates that Kent's economy had historically been driven by agriculture and mining, while Nord-Pas de Calais's economy was once sustained through old industry. Both regions felt the repercussions of the demise of old industry during the 1960s and 1970s. This left both regions with GDPs that fell below the national averages of their respective countries and the EU15 (Collier, 2001, 23). As shown, the economic benefits projected to be accrued from this development were warmly welcomed by people living within these two regions.

Chapter Five shows that after the political powers had condoned the development of a structure to bridge *La Manche*, the next point to be considered was what type of structure would be chosen to physically bridge the English Channel. In early 1985, the French and British governments called for project tenders to be submitted by 31 October 1985. Ten proposals were received but after official consultation by the selection committee, a shortlist was established comprised of four contenders to be further scrutinised. The proposals short listed contrasted greatly, varying in design, cost and mode of transport. Channel Tunnel Group- Franche-Manche (CTG- FM) produced a well researched proposal suggesting that the English Channel should be bridged by a tunnel. CTG-FM was made up of 16 separate entities these being five British contractors, three British banks, five French contractors and three French banks (Neerhout, 2001, 5). In the years that followed, this group came to be an established company named Eurotunnel.

In early 1986, after deliberations, Prime Minister Thatcher and President Francois Mitterrand met and made a joint announcement confirming that CTG-FM had been awarded the mandate "for the development, construction and operation of a fixed link across the English Channel". This structure in time came to be internationally recognised as the Channel Tunnel. The reasons given for this decision as identified by the selection committee were as follows:

- 1) Financially it was the most sound
- 2) It carried the minimum amount of technological risks
- 3) It was viewed to be the safest alternative for passengers
- 4) Maritime problems were rendered invisible
- 5) It was seen to be the least vulnerable to terrorist threats and sabotage
- 6) Experts anticipated that the environmental impacts associated with this proposal could be adequately contained (Hunt, 1994, 179).

10.2 Construction impacts

This development was a pioneering feat due to the amount of logistical, political, financial, environmental, and social challenges associated with building a tunnel below the sea bed of the English Channel. It was expected that this anticipated would have a significant influence on the:

- 1) Political arena: primarily through bi-national consultation between the respective governments and as a result of Eurotunnel being made up of a collection French and British syndicates.
- 2) Environment: it was unavoidable that this development would have a substantial impact on the natural habitats of Nord-Pas de Calais and Kent as a result of the construction and subsequent operation of the Channel Tunnel.
- 3) Economy: it was projected that economic impacts associated with this development would be felt by the regions bordering the Channel Tunnel entranceways. In addition, it was projected that this venture would also have some impact on the economics of other European Union member states.
- 4) Society: it was apparent from the design phase that the construction and operation of the Channel Tunnel would have a number of direct impacts on the people living in and around Nord-Pas de Calais and Kent.

Chapter Six shows that a number of impacts were felt within Nord-Pas de Calais and Kent as a result of the construction of the Channel Tunnel. Conclusions from this chapter outline that public opposition, disruption to the local landscape, changes in land use, temporary and permanent land possession, soil disposal and noise pollution were significant issues that arose as a result of the construction of this development. These issues affected people in Nord-Pas de Calais and Kent in a variety of ways. Lifestyle changes, loss of income through temporary and permanent land acquisition, changes to house prices, evening traffic disturbance and road congestion are all examples of how the Channel Tunnel impacted on those living in close proximity to the Channel Tunnel entranceways.

Eurotunnel recognised that the construction of the Channel Tunnel would have a negative impact on the environment and people living in Nord-Pas de Calais and Kent. By the end of 1990, 378 people out of a population of 37,960 living in the Kent region had lodged 618 complaints against the construction works.

It has been shown that Eurotunnel did seek to mitigate the issues that came as a result of the Channel Tunnel however, this is not to say that Eurotunnel was concerned with the environment or the impact that the Channel Tunnel would have on society. That said, the main motivator that ensured that Eurotunnel mitigated issues was the legislative framework enacted to govern the development.

The covering of soil during transportation, recycling waste, chalk grassland topsoil being taken from temporary work areas and re-spread at different areas, managed for the duration of construction period and then replaced after construction was completed, half of Holywell Coombe being left undisturbed, the establishment of Samphire Hoe and Fond Pignon, excess soil and equipment being moved during working hours, are all examples of mitigation methods employed by Eurotunnel in an attempt to alleviate the social and environmental effects of this development. Although some of these issues had a long term impact on the regions in question, the nature and magnitude of these issues changed dramatically between the construction and operational phases of this development.

10.3 Operational impacts

Chapter Seven found that the opening of the Channel Tunnel in 1994 generated a new set of issues for Eurotunnel and for residents living in Nord-Pas de Calais and Kent. Significant impacts shown to have arisen as a result of the operation of the Channel Tunnel include public opposition, environmental disturbance, water pollution, noise disturbance, energy consumption, water contamination, fire safety and asylum seekers. Impacts on society from tunnel operations included noise and road congestion from increases in traffic volumes, the contamination of waterways, noise pollution arising from tunnel operations, the impairment of natural resources, consumption of public funding, threats to household security and safety concerns.

Eurotunnel employed a number of systems to manage and mitigate these issues. For example, ensuring waste was disposed of in an environmentally friendly manner, establishing extra immigration controls, restricting loud speaker broadcasts to work hours and restoring the landscape.

The Channel Tunnel has also had a considerable impact on the economic dimensions of Nord-Pas de Calais and Kent. Economic impacts identified throughout this thesis include the growth in employment opportunities, increased demand for tourism services, increases in foreign investment and changes in the supply and demand of transportation facilities. These impacts affected people in a number of ways. Impacts felt by local residents included

capital gains on property, employment losses for those working in the freight industry and increased economic growth generated through increased tourism visitation.

Chapter Nine establishes that the Channel Tunnel also had an impact on the European Union. Asylum seekers, increase in demand for transportation networks, strengthening the idea of the Single European Market, adaptations to immigration policy and tourism are all examples of affects that have been felt by the EU. These impacts have affected people on a variety of levels. On the positive side, this thesis demonstrates that the Channel Tunnel has had a positive impact on people living within the European Union as it has proved an efficient, affordable, timely, all weather means of transport for goods transportation and travellers from around the globe. Findings do however, identify that there were some negative effects felt within the European Union. For example, local residents were affected by traffic congestion and delays, threat to household security due to asylum seekers and affordable transportation of goods and services.

The conclusions from this research demonstrate that a number of issues prevailed throughout the construction and subsequent operation of the Channel Tunnel. However, the nature of these issues did change throughout various stages of the development. The findings from this chapter establish that the Channel Tunnel resulted in:

- 1) Increased traffic flows from visitation and the transportation of goods: impact on residents includes noise, road congestion and dust contamination
- 2) The asylum situation at Sangatte: impact on people includes straining public resources, adaptations being made to existing public policy, additional immigration controls being implemented, threatened security of local residents and imposed additional financial costs on freight transporters.
- 3) Impact on property: decrease in property prices for properties in close proximity to the Channel Tunnel infrastructure, dissatisfaction of local residents with the financial reimbursement given for temporary or permanent property acquisition, loss of livelihood and lifestyle, capital gains received through investment interest.
- 4) Interest in investment: increase in foreign investment in both regions.
- 5) Transportation infrastructure: timely, safe, easily accessible, effective all weather mode of transportation for people.
- 6) Changes in employment: created employment opportunities throughout the construction of the Channel Tunnel, shortage in skilled workers in some areas. Since operations commenced the Channel Tunnel has created job opportunities through tunnel operations and tourism.
- 7) Significant impact on the environment- destruction to vegetation, mammals and amphibians, negative impact on ecological systems, flora and fauna.

It has been shown that Eurotunnel did implement a variety of strategies to manage and mitigate the impacts identified when appropriate. That said, there is some disparity between what Eurotunnel deemed to be satisfactory mitigation measures and the level of management that the public view adequate. One example of this outlined within this thesis is land acquisition. In many instances land owners believed that they were insufficiently compensated. However, Eurotunnel believed the financial reparations paid were adequate for the inconvenience caused to local residents.

Asylum seekers have been discovered to be a significant impact that has come as a result of the Channel Tunnel venture. This thesis has argued that this impact is the most significant long term impact that has occurred as a consequence of this development. There is a desperate need for the parties in powers to recognise and address this issue through effective mitigation methods. It is suggested that additional public policy may be a tool that could be used in an attempt to alleviate this issue. To date, immigration controls have been the instrument employed by the British and French in an attempt to alleviate this issue although, these systems have had little impact on the situation to date. This is by no means going to be an easy feat, yet, it is an issue that needs to be collectively addressed by the influential powers in France, Britain and the EU.

It has been argued that, despite the fact that the Channel Tunnel development received international exposure on a number of levels, the environmental aspects of this project have received relatively little attention (Goodenough & Page, 1994, 27). This is somewhat surprising considering the fact that transport and the environment have become “firmly established on the research agenda at a government level” (Goodenough & Page, 1994, 26). To understand the emphasis that was placed on the environment, one has to recognise the context that this project was developed within. The new found interest in social and environmental awareness during the 1980s resulted in the Eurotunnel being made accountable for some of the impacts that came as a result of the Channel Tunnel development. The legislative provisions developed to govern this development were thorough in comparison with the constraints that had been historically placed on large scale infrastructural developments. Although the environmental provisions would be deemed inadequate within the development arena in modern times, these provisions were thorough in light of the era that the development was conducted within.

10.4 Value of this research

One final question in need of being addressed is, how does this research add value? This piece is valuable for two distinct reasons. Firstly, the examination provided, and the variety of other works produced that examine the impacts associated with the development of the Channel Tunnel, prove to be useful reference cases. “Many projects will contain similar sets of circumstance, including initial lack of technical definition and simultaneous external pressure for definite information, and therefore it is suggested that the objectives, strategies and actions described in this paper could be adopted to advantage for other developments” (Kershaw & McCulloch, 1993, 30). Reports of this

nature are of particular use to people that are embarking on developments of a similar nature such as a large infrastructural project or a complex bi-national venture.

Secondly, social and environmental impact assessments facilitate our understanding of the impacts that developments have on the environment and society. Understanding of this nature alerts, amongst other groups, the government and the general public to the relationship between impacts and developments. The more robust and effective the policy instruments employed throughout the design, construction and operation of a development, the easier it is for issues to be managed and mitigated accordingly. Furthermore, S&EIA reports allow easy identification of the links between a development and issues. This allows people to distinguish how their lives may potentially be affected by a development proposal. This in turn, provides the public with information needed to understand how the development will affect them. Future research is required in the field of social and environmental impacts assessment, so that developers are better able to design and implement environmentally sustainable developments. In addition to the points made above, the format adopted by this thesis is a useful framework that can be adopted, reformulated and easily applied to assist in the evaluation of other developments.

Environmental and social impact assessments are increasingly being seen as an important component of post modern development. "EA techniques for new transport infrastructure are now an integral part of the planning process for transport projects and growing 'environmentalism' has led to greater public interest in the impact of such projects" (Page, 1994, 6). This global shift has allowed for public consultation to become a vital part of modern day development. Established consents processes in France and Britain now allow for public concerns to be heard and addressed throughout the developmental phase. As awareness towards the environmental and social impacts associated with developments augments, the process of development becomes more effective, sustainable and socially and environmentally friendly.

10.5 Difficulties with data collection

It is important to identify the inherent difficulties of drawing concise conclusions about the social and environmental impacts that have come as a result of the Channel Tunnel development. Firstly, the nature of the project itself poses a range of challenges. The sheer size of the project meant that a collection of overlapping political and economic principles needed to be examined in order to understand the developmental processes. In addition, a number of issues arose in relation to data used and analysed throughout the body of this thesis. It is important to recognise that some of the data collected was produced by organisations that had a vested interest in promoting a particular viewpoint. In an attempt to combat the issues associated with inaccurate or 'selected' data, a wide variety of sources were consulted and subsequently analysed in the writing of this thesis. Drawing from a wide range

of data sources has ensured that this work provides a balanced perspective of the overall development as far as is possible.

In addition to the points made above, there were some data collection problems associated with obtaining information from bodies who opposed the fixed transportation link. Simmons reiterates this point in his analysis of the Channel Tunnel development stating that “the public information on the project is insufficient and the planning process prevents any real and meaningful dialogue with the opponents of the fixed link project” (Simmons, 1986, 14). This is in part a reflection of the legislative framework that was employed to govern the development as demonstrated in Chapter Three.

10.6 Limitations of this Study

It took an assortment of specialists years of collective consultation, testing, observation and analysing to design the intricate workings that would come to be part of the Channel Tunnel development. The engineering, financial, legal and environmental aspects of the Channel Tunnel were all complex components in their own right. Documenting and analysing all the components of the Channel Tunnel would have been an unrealistic exercise within the framework of this thesis. The two main restrictions governing this piece of work were time restrictions and word limitations. Work for this report commenced in February 2004 and was concluded by February 2006. This timeframe provided the scope to investigate this topic in its present fashion.

This thesis has identified, summarised and examined the social and environmental issues that came as a result of the development and continued operation of the Channel Tunnel. The early chapters of this thesis are provided as an accompaniment to this analysis, while the later chapters are designed to act as a guide to the actual impacts that the Channel Tunnel has had on Nord-Pas de Calais and Kent and wider European Union. It was essential that the early sections of this thesis were included as it is impossible to understand the impacts of the development without having some knowledge of the background of the idea of bridging the English Channel, the geography of the areas under examination, the legislative processes underpinning the development and an appreciation of the alternatives considered. Understanding these facets enhances our ability to properly understand the issues and impacts that came as a result of the Channel Tunnel development.

The social and environmental impacts associated with the Channel Tunnel are inseparable from the economic impacts of the development. This occurs because all economic implications have an affect on the social. That said, it would have been misleading to render the economic components of the project invisible, yet unfeasible to examine them comprehensively. For this reason they have been identified, examined and explained in accordance with my abilities and the limited scope of this report.

The major data difficulties relevant to this work came from the lack of independent commentary produced on the Channel Tunnel development.

While there were extensive *ex ante* analysis of the Channel Tunnel produced, there “has been little or no development of *ex post* studies to assess what the impacts have been” (Hay *et al.*, 2004b, 1). In addition, the fact that there was a lack of public information released by those who opposed the development meant that there was a limited amount of information available about public concerns.

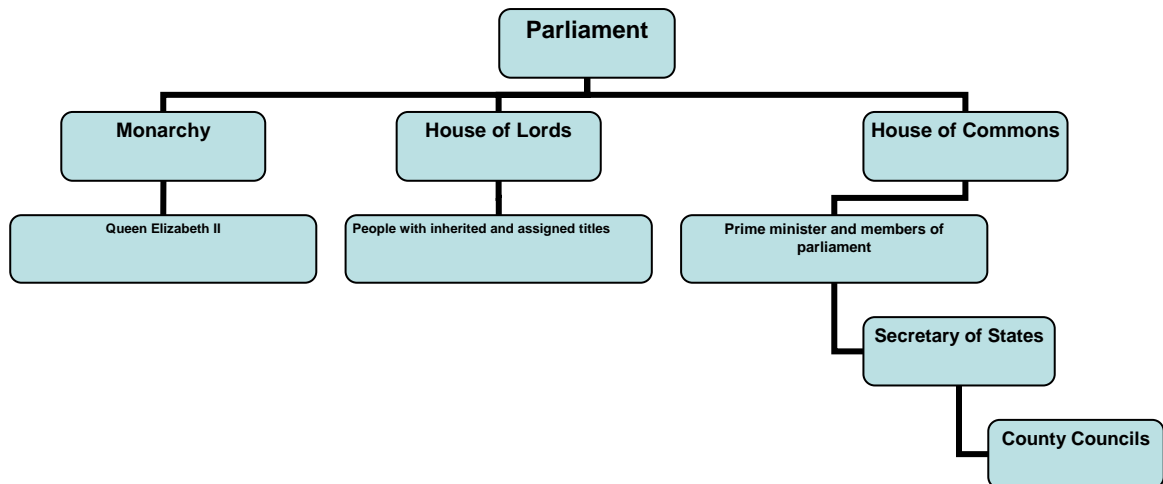
It is also important to recognise that there is value in collecting and employing primary data when producing a S&EIA. There were geographical challenges associated with this piece of research and as a result there was no direct public input used in the writing of this thesis. However, geography willing conducting public surveys and questionnaires can add value to a piece of work of this nature. That said, the main limitations placed on this thesis were time constraints, geographical location, volume restrictions and a lack of post construction studies produced on the impacts that the Channel Tunnel has had since operations commenced in 1994.

10.7 Concluding comments

The road to the construction of the Channel Tunnel was by no means a smooth one. On the contrary, the path was littered by an assortment of engineering, logistical, financial, environment, social and legislative challenges. One academic that has produced a great volume of valuable literature on the topic of the Channel Tunnel is a gentleman by the name of Roger Vickerman. It seems appropriate as an acknowledgement of his work in this field to conclude this piece with his insightful words. It is outstanding “how many teachers and students have used the Channel Tunnel as a subject for projects, how many businesses and local government authorities want to access its impacts on their interests, and how many groups in other countries have been watching the impacts to learn lessons about the effect of major new infrastructure projects on their own regions. New generations of students, researchers, teachers, consultants and business people will find this a wonderful starting point for thinking about projects. However small we might wish to make the Channel Tunnel and its effects seen, the world will never be quite the same again” (Grayson, 1990, 7).

Appendix One

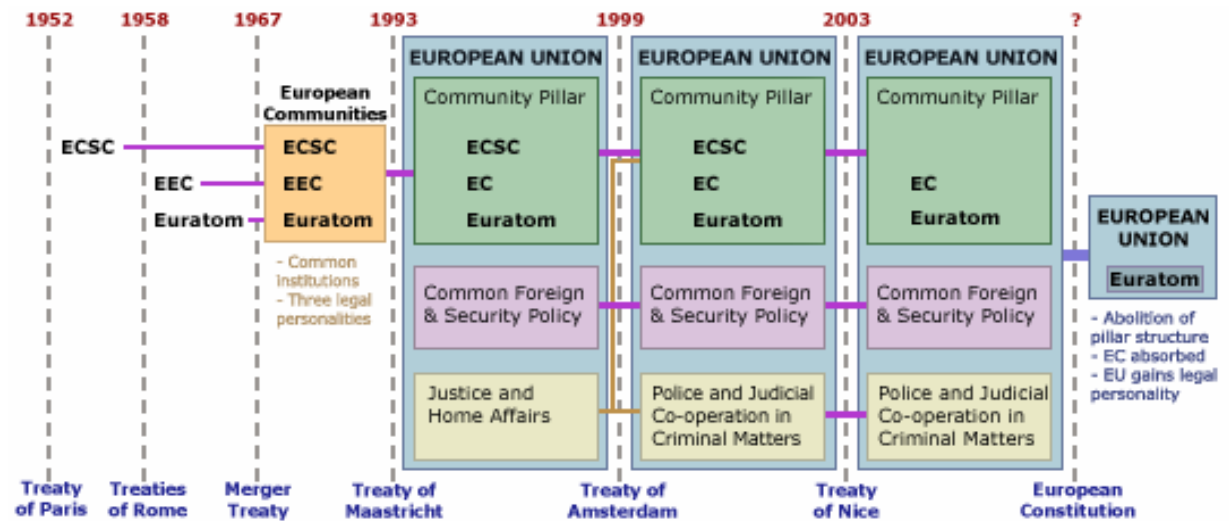
The diagram below shows the British Government's Structure.



The figure above illustrates the basic government structure of the British government as it sits today. Britain head of state is constitutionally the monarch although the monarch's powers are mostly of symbolic (The Free Dictionary, 1). The house of Lords is made up of a collection of individuals that have inherited esteemed family titles and those who have been given national acclaim for their outstanding work in any particular field (The Free Dictionary, 2). This section of parliament plays a part in all changes made to British law. The House of Commons is made up of the Prime Minister and a cluster of other party representatives (The Free Dictionary, 3). The Prime Minister is the leader of the party that holds the most seats in parliament. The head of this party appoints the ministers who head the individual government departments. These individual departments are formally known as the Secretary of States. At the bottom of the political hierarchy lies the regional bodies which are formally known as county councils.

Appendix Two

The appendix below shows the evolution of the European Union structures.



(Wikipedia, 2005, 2).

Terms of Reference

BR/SNCF	British Rail and the Société Nationale des Chemins de Fer Francis
CEC	Commission of the European Communities
CTA	Channel Tunnel Act
CTM-FM	Channel Tunnel Group- Franche-Manche
CTRL	Channel Tunnel Rail Link
EEA	European Environmental Agency
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EWS	English Welsh & Scottish Railway
GDP	Gross Domestic Product
S&EIA	Social and Environmental Impact Assessment
SEM	Single European Market
SIA	Social Impact Assessment
EC	European Community
EEC	European Economic Community
EU	European Union
USSR	Union of Soviet Socialist Republics

Bibliography

- Anderson, G., & Roskow, B. (1994). *The Channel Tunnel Story*. London: Chapman and Hall.
- Balbach, H., Jain, R., Stacy, G., & Urban, L. (2001). *Environmental Assessment*. (Second ed.). New York: McGraw-Hill.
- BBC News. (2001). *Immigrants caught in the Channel Tunnel*. Retrieved 21/11/2004, from <http://news.bbc.co.uk>
- Biggart, A., Crighton, G., & Norie, H. (1992). Tunnel Design and Construction. *The Channel Tunnel, Part One*.
- Bruyelle, P., & Thomas, P. (1994). The impact of the Channel Tunnel on Nord-Pas-de-Calais. *Applied Geography*, 14, 87-104.
- Burdge, S., & Vanclay, F. (1995). Social Impact Assessment. In *Environmental and Social Impact Assessment* (pp. 31-66). Chichester: Wiley and Sons Ltd.
- Button, K. (1994). The Channel Tunnel and the economy of southeast England. *Applied Geography*, 14, 107-121.
- Channel Tunnel Act. (1987).
- Channel Tunnel Joint Consultative Committee. (1989). *Kent Impact Monitoring*. Kent: Brian Briscoe.
- Channel Tunnel Rail Link. (2002). *Annual Environmental Report*. Retrieved 07/06/04, from <http://www.ctrl.co.uk>
- Channel Tunnel Working Group. (1989). *The Channel Tunnel: Impact on the Economy of the South East Region*. Paper presented at the The London and South East Regional Planning Conference, London.
- Chisholm, M. (1986). The impact of the Channel Tunnel on the regions of Britain and Europe. *The Geographical Journal*, 3(152), 314-334.
- Church, C. (1989). *The Channel Tunnel and European Intergration Theory*. Paper presented at the PSA Conference, University of Warwick.
- Church, C. (1989). Exploring the European dimensions of the Channel Tunnel. *The Channel Tunnel*, 167-188.
- Clark, P. (1994). *The Official Channel Tunnel Factfile*. London: Boxtree Limited.

Collier, W., & Vickerman R. (2001). *Cross-Border Activity in the Kent- Nord-Pas de Calais- Belgium Euroregion: Some Comparative Evidence*. Canterbury: University of Kent.

Council, K. C. (2004). *Central and Eastern Europe*. Retrieved 27/07/2004, from <http://www.kent.gov.uk>

Craig, S. (2002). The European Commission's Proposals for Directives to Establish a Common European Asylum System: The Challenges of Accession and the Dangers of Negative Intergration. *European Law Review*, 4, 492-502.

Darby, A., Varley, P., & Radcliffe, E. (1992). Geology, alignment and survey. *The Channel Tunnel, Part One*.

Deakin, H. (1986). Costing the Benefits of the Tunnel. *County Councils Gazette*, 112-113.

Devon, C. C., Cornwall County Council, Plymouth City Council, British Rail, Plymouth City Council, DCDC, et al. (1989). The Channel Tunnel Impact Study. In. Exeter: County Engineering and Planning Department.

Dictionaries. *English Channel*. Retrieved 14/06/2004, from <http://encyclopedia.thefreedictionary.com/English%20Channel>.

Duggleby, J., & Pilkington, J. (1993). Civil engineering works: construction. *Civil Engineering: Channel Tunnel, Part Two*, 42-50.

Encyclopaedia. *Single European Market*. Retrieved 11/09/2004, from <http://www.tiscali.co.uk/reference/encyclopaedia/hutchinson/m0041300.html>

Encyclopedia. *Hybrid Bill*. Retrieved 08/07/2005, from <http://www.encyclopedia.laborlawtalk.com>

English Welsh & Scottish Railway, & English Welsh & Scottish International. (2002). *Rail Freight and the Channel Tunnel*. Retrieved 23/08/2004, from <http://www.publications.parliament.uk>

Eperon, B. (1991). *Normandy, Picardy & Pas De Calais*. London: Christopher Helm.

Essex, J., & Gibb, R. (1994). The role of government in the planning and consultation procedures for the Channel Tunnel. *Applied Geography*, 14, 51-67.

Europa. *The History of the European Union*. Retrieved 23/11/2004, from http://europa.eu.int/abc/history/index_en.htm

Europa. *Trans-European Networks*. Retrieved 11/10/2005, from http://europa.eu.int/comm/ten/transport/index_en.htm

European Commission. (1996). *The regional impact of the Channel Tunnel throughout the Community*. Luxembourg: Office for Official Publications of the European Communities.

European Council on refugees and Exiles. *Introduction to Asylum in Europe*. Retrieved 11/10/2005, from <http://www.ecre.org/factfile/facts.shtml#17>

European Parliament. (2002). *Commissioner threatens legal action over disruption of Channel Tunnel rail services*. Retrieved 17/01/2005, from <http://www.europarl.org.uk/news/textfiles/epnews99-12july2002.htm>

Eurotunnel. (1994). *The Official Channel Tunnel Factfile*. London: Bowtree.

Eurotunnel. (2002). *Environmental Report*. Retrieved 02/02/04, from <http://eurotunnel.com>

Eurotunnel. (2003). *Environmental Report*. Retrieved 02/02/04, from <http://www.eurotunnel.com>

Eurotunnel. (2003). *Key Figures*., from <http://www.eurotunnel.com/ukcMain/ukcCompany/ukcInvestorRelations/ukc2004FinancialData/ukp2004FinancialKey>

Fayman, S., & Metge, P. (1995). The Regional Impact of the Channel Tunnel: Qualitative and Quantitative Analysis. *European planning Studies*, 3(333-357).

Francais. (2000). *No Rights, Nowhere*. Retrieved 17/01/2005, from <http://www.gisti.org/doc/actions/2000/sangatte/sythese.en.html>

Gibb, R., & Dundon-Smith. (1994). The Channel Tunnel and regional economic development. *Journal of Transport Geography*, 2(3), 178-189.

Gisti. (2000). *No Rights, Nowhere*. Retrieved 17/01/2005, from <http://www.gisti.org/doc/actions/2000/sangatte/synthese.en.html>

Goodenough, R., & Page, S. (1994). Evaluating the environmental impact of a major transport infrastructure project: the Channel Tunnel high-speed rail link. *Applied Geography*, 14, 26-50.

Google. *Definitions of Ceteris Paribus*. Retrieved 14/01/2005, from <http://www.google.co.nz>

Gossop, C. (1986). Goodbye big enquiries? *Town and Country Planning*, Sept, 225-226.

Gower, J. (2002). *The European Union Handbook*. (Second ed.). London: Fitzroy Dearborn Publishers.

Grayson, L. (1990). *Channel Tunnel: Le Tunnel Sous La Manche*. London: The British Library.

Guiraudon, V. (2002). *Immigration Policy in France*. Retrieved 14/11/2004, from <http://www.brook.edu/fp/cusf/analysis/immigration.htm>

Hay, A., Meredith, K., & Vickerman, R. (2004). *The Impact of the Channel Tunnel on Kent and Relationships with Nord-Pas de Calais*. Retrieved 08/06/2005, from <http://www.kent.ac.uk/>

Hay, A., Meredith, K., & Vickerman, R. (2004). *The Impact of the Channel Tunnel on Kent*. Retrieved 08/06/2005, from <http://www.kent.ac.uk/>

Henley, J. (2001). *300 migrants storm the Channel Tunnel*. Retrieved 10/06/04, from <http://www.guardian.co.uk>

Henley, J. (2001). *Bid to close Channel tunnel refugee centre*. Retrieved 11/06/04, from <http://www.guardian.co.uk>

Holliday, I., & Vickerman, R. (1989). *The Channel Tunnel and Regional Development Policy Responses in Britain and France*. Paper presented at the Econometrics Conference, Cambridge.

House of Commons. (2003). *Hybrid Bills*. Retrieved 21/10/2004, from <http://www.uk.parliament.uk/document/upload/105.pdf>

Hunt, D. (1994). *The Tunnel: The Story of the Channel Tunnel 1802-1994*. Worchester: Images Publishing.

Immigration & Nationality Directorate. (2004). *UK Immigration controls move to France to curb illegal migration*. Retrieved 12/09/04

Institution of Electrical Engineers (Ed.). (1997). *The Channel Tunnel Experience: Lessons for the Future*. Lille Grand Palais: Omega Print and Design.

Invicta Media. (2002). *Channel Tunnel*. Retrieved 15/06/2004, from <http://www.theotherside.co.uk/tm-heritage/background/tunnel.htm>

James, S. (2001). *Sangatte camp exposes brutal French and British asylum policy*. Retrieved 20/11/2004, from http://www.wsws.org/articles/2001/aug2001/asy1-a31_prn.shtml

Jensen, M. *The English Channel Tunnel: An Old Dream Made Possible Through Social Evolution*. Retrieved 1/04/2004, from <http://www.hotchkiss.k12.co.us/hhs/English/webfolios/mattjen/chumj.htm>

Kershaw, K., & McCulloch, A. (1993). Environmental and planning issues. *Civil Engineering: The Channel Tunnel, Part Two*, 19-31.

Kirkland, C. (Ed.). (1995). *Engineering the Channel Tunnel*. London: Chapman & Hall.

Kofman, E., & Youngs, G. (2003). *Globalisation: Theory and Practice*. London: Continuum.

Laing, K. (1995). Impact of Channel Tunnel. *Journal of Professional Issues in Engineering Education and Practice*, 121(1), 71-72.

LexisNexis. (1995). *R v Eurotunnel Developments Ltd, ex parte Stephens*. Retrieved 30/11/2004, from http://www.lexis.com.ezproxy.canterbury.ac.nz/research/retrieve?_m=b9e5520c209b1

Mapquest. (2004). *The English Channel*. Retrieved 11/08/2004, from www.mapquest.com

Microsoft. (2005, 11/02/2005). *Map Point.*, from <http://www.microsoft.com/mappoint>

Neerhout, J. (2001). *The Making of the Channel Tunnel*. Retrieved 1/04/2004, from <http://www.lib.utah.edu/gould/1995/lecture95.html>

Newman, C. (1994). English Channel Tunnel. *National Geographic*.

Noulton, J. (2001). The Channel Tunnel: Trends in Rail Freight. *Japan Railway & Transport Review*, 26, 38-45.

Office for National Statistics. (2002). *2001 Mid year population estimates.*, from <http://www.kent.gov.uk/sp/lutp/spig/Bulletins/Population/MYE1-02%20Population%20Estimates%202001.pdf>

Officers of Devon Council, Cornwall County Council, Plymouth City Council, British Rail, Plymouth Polytechnic, DCDC, et al. (1989). *The Channel Tunnel Impact Study*. Exeter: County Engineering and Planning Department.

Page, S. (1994). Spatial perspectives on the Channel Tunnel: an introduction. *Applied Geography*, 14, 3-8.

Patterson, B., Allwood, P., Middleton, P., & Kirland, C. (1992). The Channel Tunnel. Part 1, Tunnels. *Proceedings of the Institution of Civil Engineers, Part 1: Tunnels*, 6-17.

Popham, J. (1986). Procedure where promoters can't lose. *Town and Country Planning*, 12, 350-351.

Popham, J. (2002). The Future of the Major Inquiry. *Journal of Planning and Environmental Law*, 137-150.

Rohr, C., & Williams, I. (1994). Modelling the regional economic impacts of the Channel Tunnel. *Environmental and Planning B*, 21, 555-567.

Sampson, K., Goodrich, C., & Taylor, N. (2006). *Shutting down the woods: A social assessment of community response in South Westland.*, from See author

Sheail, J. (2002). *An Environmental History of Twentieth-Century Britain*. New York: Palgrave.

Simmons, M. (1986). Will the French get a better deal? *Town and Country Planning*, 55, 14-15.

Taylor, C., Bryan, C., & Goodrich, C. (2004). *Social Assessment: Theory, Process and Techniques*. (Third ed.). Christchurch: Taylor Baines & Associates.

TED Case Studies. *The Eurotunnel, Trade, and Environmental Concerns*. Retrieved 11/08/2004

The Crown. (2000). *The Channel Tunnel (Fire Services, Immigration and Prevention of Terrorism) Order 1990*. Retrieved 20/08/2004, from http://www.legislation.hmso.gov.uk/si/si/si1990/Uksi_19902227_en_4.htm

The Free Dictionary. *English Channel*. Retrieved 14/16/2004, from <http://encyclopedia.thefreedictionary.com/English%20Channel>.

The Free Dictionary. *Government in Britain*. Retrieved 13/01/2005, from <http://www.woodlands-junior.kent.sch.uk/customs/questions/government.html>

The London and South East Regional Planning Conference. (1989). *The Channel Tunnel: Impact on the Economy of the South East Region*. London.

The Royal Town Planning Institute. (1990). *Impact of the Channel Tunnel on the Regions*. Cambridge: Marcial Echenique & Partners Ltd.

Thompson, P. (2002). Major Infrastructure Projects - Where to now? *Journal of Planning and Environmental Law*, 1-22.

Tyler, R. (2001). *Britain and France seek tougher measures against refugees*. Retrieved 14/06/04, from <http://www.wsws.org>

Union Franceileene Contre les Nuisances Aerriennes. *Duty Free Sales*. Retrieved 11/10/2006, from <http://ufcna.com/infoanglais6.html>

Vickerman, R. (1994). The Channel Tunnel and Regional Development in Europe: an overview. *Applied Geography*, 14, 9-25.

Whitaker, J. (1994). *Whitaker's Almanack*. (126th ed.). London: J. Whitaker & Sons.

Wikipedia. (2005). *The Free Encyclopedia*. Retrieved 23/11/2004, from <http://en.wikipedia.org>

Wilson, D. (1991). *Breakthrough: Tunneling the Channel*. London: Random Century Group Ltd.

Wonders of the World Databank. *Channel Tunnel*. Retrieved 21/09/04, from <http://www.pbs.org/wgbh/buildingbig/wonder/structure/channel.html>