

WEST SUSSEX BIO CITY



Bio City Development Company

Pre-Feasibility Study

November, 2010

DISCLAIMER

This study was prepared by BCDco after discussion with the parties, as part of consulting services provided under the project outline agreed by the parties. Representations, warranties and liability are regulated by the BCDco standard terms of business only and are limited to BCDco. In particular, the study neither obliges nor otherwise legally binds the members and/or partners of BCDco.

BCDco has carried out this study in accordance with generally accepted professional techniques and good industry practices. BCDco has observed sound management practices and methods. However, neither BCDco nor any person acting on behalf of BCDco makes any warranty or representation whatsoever, express or implied, with respect to the use of any information, method, process, conclusion, result or similar item disclosed in this document, including fitness for a particular purpose. In particular, although BCDco has made best efforts to verify the correctness, accuracy, reliability, completeness, usefulness, timeliness, legality and otherwise of the data, information, processes and methods used in the study, BCDco disclaims any respective warranty, representation and/or liability.

In addition, neither BCDco nor any person acting on behalf of BCDco assumes responsibility for any damages or other liability whatsoever, including any consequential damages, resulting from the use of this study or any information or recommendation contained herein. Therefore, BCDco will not be liable for any claims or lawsuits from any third parties arising from the use of and/or reliance on this study and its recommendations. This study is not intended as an offer, or a solicitation of an offer, to buy or to sell any services, specific products or investments.

Table of Contents

	Page
Executive Summary	4
Introduction	6
<u>Section I:</u> The Shifting Paradigm of the Global Healthcare Industry	10
<u>Section II:</u> Study of Existing Supply in West Sussex	22
<u>Section III:</u> Biomedical Clusters and Science Parks: Development & Investment Drivers	52
<u>Section IV:</u> Case Studies & Benchmarking	63
<u>Section V:</u> Implementation Matrix	91
<u>Section VI:</u> Project Financial Model	99
Next Steps	100
Footnotes	101

Executive Summary

The project includes the planning, development, design, construction and operation of the West Sussex Bio City project ('WSBC'). This document identifies the key factors necessary for a successful Bio City project, and provides a high-level evaluation of the suitability of West Sussex as a location for such a project, and an initial analysis of its potential viability.

The 'Introduction' outlines the Brief of the document, identifies the parties involved in the report, defines the key elements of a Bio City, and what it would provide to West Sussex. The Methodology employed in compiling the report is described, and its compliance to the Freedom of Information Act.

'Section I' considers the context and trends of the global healthcare industry. This includes the commercial Biomedical R&D sector, the role of Public Private Partnerships in medicine & R&D, their links with the higher education sector, philanthropic organisations, Venture Capital, and blue chip industry. The outputs of a bio-medical-educational nexus are identified along with the key components that WSBC must contain to be successful in this sector.

'Section II' provides an overview of the existing healthcare sector in West Sussex and surrounding regions, their demographics and current performance. The implications of WSBC within this environment are considered. Likewise the existing presence commercial Biomedical companies and the supply of Higher Education in the region are identified. Local university management provide their opinion of the prospect of WSBC, as well as local GPs and NHS executives. Separate consideration is then given to West Sussex as a suitable location for advanced healthcare facilities, a Life Sciences Park, and further real estate development. Five potential sites in the West Sussex area are identified and a SWOT analysis run on them all with consideration given to the role of real estate development as an enabling factor for the viability of the whole project. North Horsham is identified provisionally as the most suitable location.

'Section III' traces the development of Biomedical Clusters and Science Parks, identifies and then describes their investment drivers. This provides a blueprint for a successful Science Park in the current environment.

'Section IV' looks at various case studies and provides some initial benchmarking for WSBC's potential against a basket of the most successful science parks in the world. Two of the most successful science parks – Biopolis in Singapore and Sophia Antipolis in France – are considered in more detail, as well as five other examples of successful science parks associated with major hospitals.

'Section V' considers the specific implementation factors for WSBC. An outline timescale is proffered for discussion, along with an outline strategy for procuring some of the key elements of the project – anchor tenants and Venture Capital. It identifies the challenges for developing WSBC within the current national context, as well as West Sussex.

'Section VI' summarises a detailed Financial Model run on 3 of the most suitable locations identified in Section III. As this contains commercially sensitive information, the details are contained in Annex 1 which will remain confidential to the WSBC Parties. In this analysis, North Horsham is the most viable of the 3 locations tested and shows marginally positive returns. Given the conservative level of the assumptions made, BCDco conclude that this is an encouraging basis to develop the feasibility of the project further.

'Annex I' contains the commercially sensitive information that remains confidential to the WSBC parties and thus will not be published with the main body of the report. It first summarises the assumptions and conclusions of the 3 locations on which Financial Model was run. Candidate projects partners and consultants are identified, and the investment structure outlined. The full financial model run on the North Horsham site is included. This consists firstly of summary pages & graphics of the assumptions and key conclusions, then a written guide to the detailed model is provided to assist readers. The final 43 pages consists of the detailed Financial Model itself.

INTRODUCTION

Brief

This document has been produced in response to discussions held between representatives of BCDco, local authorities and local elected politicians over the past 24 months. The Parties comprise:

- West Sussex County Council
- Crawley Borough Council
- Horsham District Council
- Sussex Health Care
- The Development Consortium comprising:
 - o Bio City Development Company ('BCDco')
 - o Global Medical Forum
 - o The Blackstone Group, Advisory Department

A Bio City, as developed by BCDco, comprises at its core a high quality tertiary care teaching hospital, along with ancillary healthcare services; an adjacent science-based business park including medical research facilities; and accompanying commercial and/or residential real estate. Financially its revenues are generated in the long term by the healthcare venture, and IP opportunities, and in the shorter term from real estate returns.

The transfer of acute services away from Crawley Hospital and the downgrading of services at Horsham District Hospital have left a gap in the provision of high calibre, locally delivered, medical services in the Crawley/Horsham area.

West Sussex Bio City is a potential solution to the current shortfall in locally delivered hospital care, including the provision of an accident & emergency department. It could also transform the area into one of the UK's leading centres of biomedical research. The West Sussex Bio City would be a new medical, scientific, humanitarian venture in which the local medical & scientific community engages with academic centres of excellence and both commercial & non-profit biomedical research organisations in order to generate sustainable medical excellence and new intellectual property.

The Parties wish to determine the pre-feasibility of establishing West Sussex Bio City, and a BCDco has undertaken to carry out this study.

BCDco is an organization with comprehensive knowledge of all the parameters that will determine the success or failure of such an undertaking, understands the mission of the parties involved, and, as initiator of the Bio City developments has an overriding interest in being certain that the factors for long-term sustainable success are present and operable in West Sussex prior to making a major investment.

Therefore, the study reviews all those factors that will influence success or failure of such a center. It thus presents a pre-feasibility plan for the development of West Sussex Bio City.

Methodology

The methodology and sources of information have entailed desk and field research and derived as follows:

- Extensive interviews with the organizations and key individuals concerned, locally and internationally, to determine the goals, commitment, and expectations of the several parties;
- Extensive interviews with participants and external organizations to understand and quantify the financial and material requirements of the center;
- Third party analyses of the emerging trends in the global healthcare industry with special attention to the drivers of the pharmaceutical research and development business and how they affect West Sussex as a possible business locale;
- Third party analyses of the evolving dynamic of the global marketplace;
- Interviews with executives of biomedical companies;
- Discussions with leading academic and industrial scientists;
- Talks with governmental development agencies in the USA, Europe, and the United Kingdom;
- Interviews with major educational institutions and pharmaceutical companies with existing operations in the region;
- Extensive desktop research.

A list of interviewed organizations, specific questions and approach are provided at the end of each Section. Direct attributions and references are footnoted and provided at the end of the document.

Freedom of Information Act, 2000

As a study partially funded by UK public authorities, the report is subject to compliance with the Freedom of Information Act, 2000 ('FOI'). The report is available to the public by application to the relevant public authorities.

Some of the information developed in the report is deemed to be commercially sensitive, and as such remains confidential to the Parties of this report, as exempted by Section 43 of the FOI. All such information is contained within Annex 1 of the report. This is proprietary trade information held by the Development Consortium and its partners, or has been provided for the purposes of the report on the basis of confidentiality and as such would be prejudicial to the sources of the information for it to be revealed to the public, and could result in contradiction of legal agreements to do so. All conclusions drawn from any such confidential information are included in the full report.

SECTION I:

**THE SHIFTING PARADIGM OF
THE GLOBAL HEALTHCARE INDUSTRY**

Trends that are currently shaping the global healthcare industry

The global healthcare industry is currently in a transitional phase, characterized by the following trends, each of which will dramatically impact a potential West Sussex Bio City:

- **Escalating costs and expectations:** across the globe, the cost of healthcare is escalating as technology evolves and life expectations and life expectancies rise.
- **Managed Care and Disease State Management:** With spiralling costs, “managed care” has become the only practical way of delivering high-tech care, with unrestricted access, to an acceptable standard. The only alternative is rationing of care that would be unacceptable in a developed society. This “disease state management” is underpinned by a sophisticated system of audit that, in its ideal form, ensures the delivery of quality care at an affordable price. This process is becoming all the more important as public health systems switch from being providers of health care to commissioners of healthcare
- **Rationalisation and integration:** the healthcare industry has responded to the pressures that it faces with a process of horizontal and vertical integration as all industry players (hospitals, universities, insurance companies, pharmaceutical companies, drug purchasing and distribution organizations, etc.) have moved to shore up their strategic positions. This can be seen in the development of networks of hospitals for the delivery of specialist care, such as cancer care networks, on the one hand and massive mergers, such as that between Merck & Schering-Plough, on the other.
- **Innovation and returns:** Despite cost pressures, the pace of medical innovation and discovery has been accelerating.
- **Cost efficiencies:** In many instances, newer technologies lead to better outcomes, shorter lengths of stay and cost efficiencies.
- **Attractive returns:** in the face of recent economic recession, the steady long term returns from healthcare present an attractive prospect for investors.

Changes in the for-profit biomedical R&D sector

Revenues in the global pharmaceutical sector exceeded US\$770 billion in 2008¹. The way in which this massive industry is evolving presents significant opportunities for West Sussex Bio City. The key trends and developments can be summarised as follows:

- **Sharp increase in costs of development:** This has forced a re-think in structure and approach. The cost per new drug rocketed from US\$82 million in 1980, to US\$136 million in 1985, to US\$230 million in 1990 to US\$850 million in 2006². These costs are likely to continue to rise. The traditional single, vertically-integrated pharmaceutical entity is now being replaced with a more fragmented and specialist structure of alliances, networks and partners.

• **Longer development cycles:** New product development cycles have doubled to 12.8 years³ over the past two decades putting pressure on finances as lead times to market grow and reliance on the existing product set intensifies.

• **Globalisation and localisation:** The changing nature of collaboration and communication is leading to a need for a much more focused approach to drug development. Increasingly the industry itself will focus on the development and marketing of new compounds while the research is devolved to academic institutions such as West Sussex Bio City or smaller, innovative, entrepreneur-led companies. Cross-border research projects, especially between Asia and Europe/North America will also represent an ever-larger source of innovation output.

• **Pricing and government policy:** increasingly, the industry is seeing the establishment of research facilities in emerging market locations, with the attendant creation of high calibre employment, not just as a means of tapping into a new workforce but as a way to influence the governments of those countries and of having a say in the way their approach to drug pricing policy is developed.

The new role and position of Public Private Partnerships (PPPs) in clinical medicine

PPPs today represent the next wave of healthcare delivery. In clinical medicine around the world, public-private or state-investor joint ventures are the next wave for delivery. Key examples of significant state support with a strong private component include:

- **Boston Children's Hospital:** Public sector contributes land, funding, patients
- **Karolinska Hospital Sweden:** Public sector contributes patients, funding
- **Cleveland Clinic Abu Dhabi:** Public sector contributes all capital requirements
- **University Hospital Zurich:** Public sector contributes all public patient costs and all capital costs.

On a national basis, the public sector in general contributes the following funding percentages to healthcare delivery:

- **United States of America:** 55% via Medicare/Medicaid + VA etc.
- **United Kingdom:** 85% via the NHS
- **Switzerland:** 10% via government hospitals
- **Emerging Markets:** 90% via government hospitals

The systems differ widely, but in all countries regulators are finding a public-private mix to be most cost- and quality-effective.

Biomedical Research PPPs

In biomedical innovation and discovery, the situation is similar with PPP now considered the most effective and efficient system. Key global examples of biomedical research PPPs include:

- **Research Triangle Park, North Carolina, USA:** Public sector contributes land and tax breaks
- **Oxford & Cambridge Science Parks:** Public sector contributes some land and funding
- **Qatar Science & Technology Park:** Public sector contributes land and all capital requirements
- **Zurich Biomedical Incubators:** Public sector contributes land and significant tax incentives.

The major sources of private funding, as seen from the perspective of the biomedical cluster, for the above projects include:

- **Private developers:** Capital for construction and land purchase
- **Research grants from foundations:** Long-term revenues
- **Pharmaceutical and medical technology industry:** Long-term revenues
- **Clinical medicine:** Long-term revenues
- **Banks:** Debt finance for construction and equipment
- **Venture capital funds:** Long-term revenues

The centrality of medical and life science education to biomedical PPPs

At the core of the biomedical cluster is the higher-education cluster, for the following reasons:

- **Skilled labour:** Biomedical companies base their relocation analysis on education levels of local populations
- **Research teams:** Educational institutions run major research programs to which biomedical companies can sub-contract research
- **Stability:** Established employers like universities imply labour stability / lack of “brain drain” / sustainable employment
- **Standard of living:** Education-centric regions tend to have a very high quality-of-life rating

Key Example

Novartis in large part based its 2001 decision to move its R&D headquarters from Switzerland to Cambridge, Massachusetts, on the number of PhDs per square mile in the Boston area as well as the incredible clinical power of the Boston teaching hospitals. These hospitals in turn rely on the Massachusetts cluster of universities for their skilled labour pool. The Novartis headquarters now employs over 1000 researchers and has indirectly created an additional 4000 local jobs.

The importance of philanthropic organizations in the creation and maintenance of PPPs

Philanthropic organizations are central to the development of PPP biomedical clusters for the following reasons:

- **Funding volume:** They are the single largest funding source for early stage biology- and chemistry-related research.
- **Profitability:** That research is the foundation for later drug and device development, the founding element of a vibrant biomedical for-profit sector.
- **Pure discovery:** Their funding is unencumbered by equity return requirements and can therefore support leap-frog discoveries upon which multiple later drugs and devices are based.
- **Multiplier effect:** Their funding enables co-funding from government, industrial and other private sources, thereby doubling the total early-stage biomedical funding available to the global research community.

Through these mechanisms, philanthropic organizations can support up to 50% of a given biomedical clusters high-quality jobs, both directly and indirectly.

Key Example

The Bill and Melinda Gates Foundation provides over \$1.5 billion in biomedical research grants per year and thereby supports over 10,000 high-quality medical research jobs around the world. This is equivalent to the number of research jobs at a major global pharmaceutical company.

The importance of Venture Capital in the creation and maintenance of PPPs

Venture Capital is central to the development of PPP biomedical clusters for the following reasons:

- **The seeds of growth:** It is the source of funding for early- and mid-stage companies which locate within biomedical clusters and provide new discoveries from which either established biomedical companies create profitability or new large-scale enterprises are born.
- **Spin-off funding:** It provides an exit for large companies which wish to spin-off business lines which have become non-core but remain of scientific or commercial interest.
- **Commercialization:** It supports commercialization at universities thereby rewarding the educational sector for its contribution to biomedicine and creating new jobs.
- **Quality system:** It is a performance driven filter through which the least promising technologies are weeded-out.

Key Example

The most dramatic example of the relationship between the availability of venture capital and the creation of high-quality employment in the biomedical sector is seen in Israel. The state seeded a heretofore non-existent VC sector in the early 1990s with \$500 million of investment. In turn, this attracted an additional \$4.5 billion of co-investment from the private sector. Israel is now second only to the US in the number of biomedical companies listed on NASDAQ. It creates more patents in biomedicine per person than any country in the world.

The importance of blue chip industry in the creation and maintenance of PPPs

The large pharmaceutical and medical technology companies are central to the development of PPP biomedical clusters for the following reasons:

Funding power: The industry has deep pockets which can fund the over \$800 million needed for each drug which makes it to market.

Marketing reach: The industry has an unrivalled marketing network which be deployed to sell almost any kind of biomedical innovation.

Indirect support: The industry is itself a supporter of philanthropic institutions and venture capital funds.

Integration: The industry works closely with hospitals to seamlessly integrate new innovations and discoveries into the clinical setting.

Key Example

The pharma facilities within Research Triangle Park in North Carolina supports hundreds of research personnel while also serving as a regional sales and marketing hub while also providing funding to the highest-quality biomedical research teams at the neighboring Duke University, University of North Carolina and North Carolina State University.

Outputs of the new paradigm of the biomedical-educational nexus

Industry, academe, non-profit foundations and governments work together to support the entire continuum of healthcare from discovery to clinical introduction by creating the following areas of synergy:

Early stage biomedical innovation: Through a combination of sources of funding biomedical clusters support projects in systems biology and related fields which make important basic discoveries upon which for-profit research can be immediately undertaken.

Synthetic chemistry: The translation of the basic discoveries into commercial products and components by both for-profit and non-profit sources enables the emergence of a strong and growing employment base.

Clinical trials: The testing of those products in a safe therapeutic environment proves their efficacy and allows for global roll-outs.

Clinical introduction: The marketing and usage of those products on a wide scale bring profitability back to the companies located within the biomedical cluster in which the original discoveries were made.

Production: the resulting mass production of those products for global distribution can be undertaken either directly within, or close to, the biomedical cluster.

Key Example

The greater Boston area supports each of the above areas via a planned strategy for innovation support. This means that each tax jurisdiction within the area competes with neighbouring jurisdictions for the best projects, companies and people.

How this can be applied to West Sussex Bio City

In order to compete in this competitive global PPP environment wherein all of the above sectors are searching for locations of the best value where other players in the continuum are already established, West Sussex Bio City must contain the following components if it is to leverage the biomedical continuum:

- **An established centre of clinical excellence:** Biomedical clusters have always developed in relation to centres of clinical and research excellence and more often than not, especially when created *de novo*, have received state support in the form of land, tax concessions, training grants, etc
- **A major blue-chip industry tenant:** A core pharmaceutical or medical technology company which can leverage the advantages of being close to the above centre of excellence and below research facilities
- **A biomedical incubator facility:** This is the source of the early stage commercialization described above
- **Associated support space:** Including key worker accommodation, office space, retail space and all other facilities which will allow the Bio City to serve as a magnet for the region as well as globally.

Co-dependency between an acute hospital and a research park – can these stand apart or only together?

Clearly, an acute hospital can stand alone without association with a science park. BUT, a science park exists to facilitate technology transfer and a large component of technology transfer is the introduction into the clinical setting of new discoveries and innovations.

The transition from laboratory to clinical research is crucial to development & marketing of both devices and compounds.

Therefore, geographical proximity to tertiary acute services of the highest calibre (plastic surgery, neurology/neurosurgery, oncology, renal & state-of-the-art diagnostic imaging) is a powerful draw to potential tenants, and one which has not been exploited by existing parks in the UK.

Section I - Conclusions

- Public Private Partnerships (PPP) represent the next wave of healthcare delivery and biomedical research.
- Medical and Life Science Education is central to Biomedical PPPs because of the linkage between innovation and quality healthcare.
- Philanthropic organizations, blue chip biomedical industry companies and the Venture Capital industry are also vital components of PPP biomedical clusters, and support the entire continuum of healthcare from discovery to clinical introduction.
- To compete in the global PPP biomedical environment, West Sussex Bio City must include:
 - A centre of clinical excellence.
 - A major blue-chip industry tenant.
 - A biomedical incubator facility.
 - Associated support space.
- Geographical proximity to world-class tertiary acute services is a powerful draw to potential tenants, and is not offered by most existing parks in UK.

Study Section Research Status: Interviews

Completed Interviews:

- Tufts University (Pharma research department).
- Merck Pharmaceuticals
- Boston Children's Hospital
- University Hospital Zurich
- Savills UK
- Qatar Science & Technology Park
- HBM Partners
- Novartis
- Bill & Melinda Gates Foundation

Key Questions:

- Do you believe a new science park is needed in the South East region and why?
- What have been your main challenges as science park operators in the UK?
- What is your view of the future of the industry?
- Where do UK science parks sit today within the global context?

Interviewer Pitch:

BCDco, in cooperation with the local authorities, is assembling a study of existing healthcare and biomedical research space supply in the South-East of England. Key backers of the study include Horsham District Council, Crawley Borough Council, West Sussex County Council. As a part of the Study, the authors are seeking to understand existing stakeholder views of local supply and demand in order to ensure that any new developments in the region do not in any way duplicate supply. The study will be used to recommend to regional authorities whether development programs should be initiated in the area. BCDco would appreciate your anonymous contribution to this effort so as to create the most effective supply recommendation. References from local backers of the Study are available on request.

SECTION II

OVERVIEW OF EXISTING SUPPLY

Strategic Health Authorities Adjoining Horsham/Crawley

South East Coast SHA

4.2 million people

3600 square miles

25 NHS organizations (8 PCTs, 12 acute Trusts, 3 mental health Trusts, 1 community rehabilitation Trust and the South East coast ambulance service)

Nearly 100,000 staff

£6bn spent every year on healthcare

South Central SHA

4 million people

3800 square miles

24 NHS organizations (9 PCTs, 9 acute Trusts, 3 mental health Trusts, 1 learning disability Trust, 1 specialist orthopaedic Trust)

88,000 staff

£5.8bn spent every year on healthcare⁴

Primary Care Trusts Adjoining Horsham/Crawley

South East Coast PCTs

Surrey PCT

West Sussex PCT

East Sussex Downs & Weald PCT

West Kent PCT

Hastings & Rother PCT

Brighton & Hove City PCT

Medway PCT

Eastern & Coastal Kent PCT

South Central PCTs

Isle of Wight PCT

Oxfordshire PCT

Buckinghamshire PCT

Milton Keynes PCT

Berkshire West PCT

Berkshire East PCT

Hampshire PCT

Southampton City PCT

Portsmouth City Teaching PCT

Table 1. Catchment Area population⁵

PCT	Population
Surrey	1,000,000
West Sussex	760,000
East Sussex Downs & Weald	497,000
West Kent	655,700
Hampshire	1,250,000
TOTAL	4,162,700

Fig 1. Catchment Area PCTs

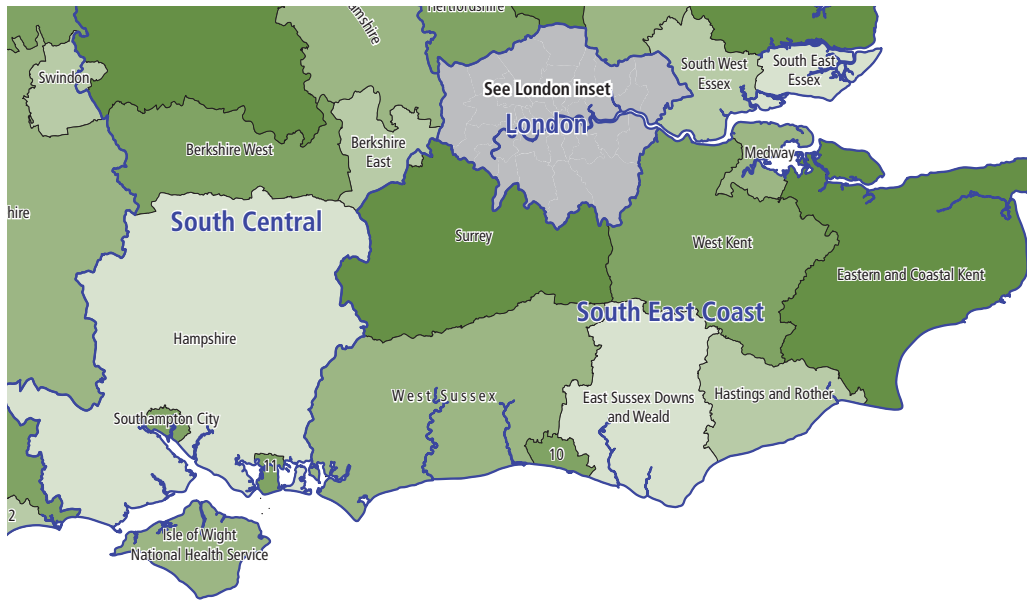


Table 2. Acute hospitals within catchment area⁶

	Brighton University Hospitals		Princess Royal Hospital & Hurstwood Park		Queen Victoria Hospital		East Surrey Hospital	Frimley Park Hospital	Royal Surrey County Hospital	Worthing Hospital	Total
Total beds	80	559	275	564	401	493	636	527	443	3978	
Level 2 Critical Care Beds	3	8	4	6	6	-	17	10	12	66	
Level 3 Critical care beds	2	17	7	8	6	-	7	7	6	60	
Day care surgery beds	6	38	-	11	-	20	38	27	12	152	

Table 3. Quality account⁷

	Queen Victoria Hospital	Brighton University Hospitals	Princess Royal Hospital & Hurstwood Park	St Peter's Hospital Chertsey	Western Sussex Trust Hospitals	East Surrey Hospital	Frimley Park Hospital	Royal Surrey County Hospital
Banding for patient safety	-	5	5	4	2	2	5	4
Patient safety summary score	-	94.52	94.52	69.18	26.03	15.75	94.52	87.67
% single rooms	22	10	11	14	24	23	12	24

Table 4. A&E attendances in catchment area Q4 2009-2010⁸

Name	First attendances	Follow up attendances	Total attendances
Ashford and St Peter's Hospitals NHS Trust	23,283	2	23,285
Brighton and Sussex University Hospitals NHS Trust	29,967	1,510	31,477
East Sussex Downs And Weald Primary Care Trust	6,347	601	6,948
East Sussex Hospitals NHS Trust	27,506	736	28,242
Frimley Park Hospital NHS Foundation Trust	22,782	0	22,782
Hampshire Primary Care Trust	4,270	535	4,805
Royal Surrey County Hospital NHS Foundation Trust	16,660	60	16,720
Surrey and Sussex Healthcare NHS Trust	12,105	19	12,124
Surrey Primary Care Trust	23,467	1,119	24,586
West Kent Primary Care Trust	15,601	1,486	17,087
West Sussex Primary Care Trust	12,965	68	13,033
Western Sussex Hospitals NHS Trust	29,034	816	29,850
Total	223,987	6,952	230,939

Summary of private hospitals in catchment area

- Most are small clinics with limited critical care facilities
- Frequently co-located with NHS counterpart
- Mostly undertaking straightforward elective surgery
- Three providers represented (Spire, BMI & Nuffield)

Table 5. Private Hospitals in Catchment Area⁹

Hospital	Beds	Hospital	Beds
BMI Mount Alvernia	76	Nuffield Guildford	54
BMI McIndoe	27	Nuffield Chichester	40
BMI Goring Hal	38	Nuffield Haywards Heath	42
Spire Clare Park	34	Nuffield Brighton	56
Spire Gatwick Park	44		

Acute hospitals in catchment area

- Approximately 3500 beds
- All acute services represented
- Renal & cardiothoracic services in Brighton (or London)
- Tertiary care
 - Brighton University Hospitals (major university teaching campus)
 - Hurstwood Park (neurology/neurosurgery centre)
 - Queen Victoria Hospital East Grinstead (plastic & reconstructive, maxillo-facial surgery, burns unit)
- Two hospitals in the area are among the worst performing Trusts in the UK

Table 6. GP Practices in the West Sussex PCT

Mid Sussex Healthcare, Hurstpierpoint	Adur Medical Group, Shoreham
Langley House Surgery, Chichester	Riverside Surgery, Horsham
Lavant Road Surgery, Chichester	Pulborough Medical Group, Pulborough
Selsey Medical Centre, Selsey	Newtons Health Centre, Haywards Heath
Croft Surgery, Eastergate	Cathedral Medical Group, Chichester
Arun Medical Group, Littlehampton	Avisford Medical Group, Yapton
Park Surgery, Horsham	Moatfield Surgery, East Grinstead
Lime Tree Surgery, Worthing	Maywood Healthcare Centre, Bognor Regis
Victoria Road Surgery, Worthing	Fitzallan Medical Group
St Lawrence Surgery, Worthing	Worthing Medical Group
Holbrook Surgery, Horsham	Lyons Practice, Shoreham
Bersted Green Surgery, Bognor Regis	Northbourne Medical Centre, Shoreham
West Meads Surgery, Bognor Regis	Park Surgery, Littlehampton
Maywood Surgery, Bognor Regis	Woodlands Surgery, Crawley
Southbourne Surgery, Emsworth	Arundel Surgery, Arundel
Norfolk Surgery, Bognor Regis	Saxonbrook Surgery, Crawley
Mayflower Surgery, Worthing	Pound Hill Medical Group, Crawley
Billinghurst Surgery, Billinghurst	Parklands Surgery, Chichester
Seal Medical Group, Selsey	Courtyard Surgery, Horsham
Broadwater Medical Centre, Worthing	Steyning Health Centre, Steyning
Willow Green Surgery	Strand Medical Group, Goring-by-sea
Cuckfield MC ,Cuckfield	Cornerways Practice, Worthing
Leacroft Medical Practice, Crawley	Loxwood Medical Practice
Ship Street Surgery, East Grinstead	Westcourt Medical Centre, Rustington

Note to Derivation of Hospital Catchment Area Data

The derivation of the figures for the catchment area has been based on the following assumptions:

- Horsham/Crawley lies roughly at the centre of a circle that comprises the four western PCT's of the SE Coast SHA and the easternmost PCT of the South Central SHA (Hampshire).
- This area has a population of some 4 million people. There are currently five acute hospitals in the area. A sixth hospital would reasonably expect to attract one sixth of the acute work in the catchment area, especially were it to be located at the area's centre.
- If the WSBC hospital were to contain specialist neurology/neurosurgical & plastics unit, the national/international reputations of these units would be expected to attract patients from a wider area and the model has therefore been adjusted to reflect an increase in the total workload in these specialties from 16% of the addressable market to 25%.
- The A&E dept is expected to draw the majority of its cases from an inner catchment area, 20-30 minutes drive from the hospital, serving 9% of the A&E attendances of the total region. The caseload is expected to be 85,000 first attendances per annum similar to that handled by Frimley Park Hospital i.e. a medium sized A&E facility to serve primarily the north of the Western Sussex area.

WSBC hospital in the Context of the Local Healthcare Economy

The Conservative-Liberal Democrat coalition government has made the empowerment of local communities a central theme of its policies. The transfer of acute services away from a local district hospital is invariably met with substantial local opposition. The half-life of this opposition is a powerful indication of the strength of that opposition. With time, either through resignation or through a measurable improvement in services, the sentiment tends to fade. The popular animosity to the transfer of acute services from Crawley & Horsham Hospitals has enjoyed a long half-life. The reasons for this are self-evident:

- The East Surrey Hospital is consistently rated as one of the worst performing Trusts in the country. The reasons for this are numerous but lack of capacity is commonly cited.
- The geography of the area is such that the journey time both for emergency and routine access remains unacceptably high.

The policies of the current government will continue a process of decentralisation in the provision of healthcare that was started by the last Conservative government in 1978 and continued under the Labour governments from 1997-2010. Central to that policy is the immutable tenet that this healthcare be free at the point delivery and accessible to all. Nevertheless, the process whereby the NHS metamorphoses progressively from a provider of healthcare to a commissioner is almost certainly irreversible. This metamorphosis reflects both the economic realities of healthcare provision in the 21st century and the

current government's stated intention to put the commissioning of healthcare in the hands of general practitioners and their patients as opposed to the, soon to be defunct, primary care trusts. It is highly unlikely that a new government, of whatever political hue, would be able to reverse that process. Throughout the EU, open access, patient-choice driven, healthcare is becoming the norm. The moral hazard of an increase in hospitalisation rates, driven by a system of payment by results, is mitigated by the application standardised tariffs by central government, by the empowerment of general practitioners and, above all, the intuitive common sense of the patients themselves.

Existing Provision

There is no doubt that the establishment of a new acute services hospital in the Horsham area would have an impact on the existing acute hospitals. The development of a strategy of mitigation for the existing providers is beyond the scope of this study. However, whilst this competition may have negative consequences for the existing providers, inasmuch as they may be required to re-orient some of the services that they provide, there may also be beneficial consequences: given that lack of capacity is frequently cited as the reason for the poor performance indices of some of the existing providers, it is reasonable to suggest that increasing the number of acute beds in the area will alleviate some of this pressure and see an improvement in standards across the entire sector. As a privately owned facility, the survival of the WSBC hospital will depend entirely on its ability to compete with these existing providers by providing the right services in the right place for the population that it is designed to serve. The authors are committed to seeing the development of a new acute hospital that operates to the highest standards and is conveniently located for the population of West Sussex and its environs.

Biomedical industry presence in the area

Manufacturing

GlaxoSmithKline, Worthing
Varian Medical Systems UK Ltd, Crawley

Research & Development

Novartis
NIBR (Novartis Institute for Biomedical Research) Horsham
Respiratory & GI R&D
Discovery Chemistry
Biomarker research
12 post-doctoral research fellows

Administration

Novo Nordisk UK HQ
307 employees

Roche Diagnostics UK HQ
473 employees

Toshiba Medical
UK HQ Crawley

Universities in the catchment area

Bournemouth University

University of Brighton

University of Chichester

Cranfield University

University of Kent

University of Portsmouth

University of Southampton

Southampton Solent University

University of Surrey

University of Sussex

University of Winchester

Universities with medical schools & life sciences faculties

University of Southampton

Top 15 research university in the UK

Faculty of medicine, health & life sciences

School of Biological Sciences

School of Health Sciences

School of Medicine

School of Psychology

MHLS Graduate School

224 medical graduates per annum

University of Brighton

21,000 students across five campuses

Undergraduate medical course run in conjunction with University of Sussex

136 medical graduates per annum

Other health sciences undergraduate courses

Biological & biomedical sciences

Nursing & midwifery

Pharmacy

Health professions (occupational therapy, physiotherapy etc)

University of Sussex

Top 20 UK university

Undergraduate medical course run in conjunction with University of Brighton

Other life sciences undergraduate courses

Biochemistry

Biology

Biomedical sciences

Medical neuroscience

Psychology

Universities with Life Sciences Faculties

University of Surrey

14,000 undergraduates, top 20 UK university for nursing and sciences related to medicine

Mechanical, medical & aerospace engineering

Chemical sciences

Biochemical sciences

Health & Social Care

Microbial Sciences

Nutritional Sciences

Postgraduate Medical School

Other universities in the catchment area

Cranfield University

Wholly post-graduate university

Strong biosciences school covering design of diagnostic devices to food preservation

Postgraduate courses in health management, nanomedicine & molecular biology

University of Kent

School of Biosciences ranked 1st by NUS

Strong mathematics, statistics & actuarial science

University of Bournemouth

Undergraduate courses in nursing, midwifery, paramedic science & operating theatre practice

University of Portsmouth

Biochemistry & Genome Science, Clinical Health Science

Notes from a telephone interview with Mr. Colin Monk, Pro Vice-Chancellor (Business & Marketing), University of Brighton

What would be your reaction to the establishment of a Bio City in the Crawley/West Sussex area?

Crawley has very low rates of unemployment but a “skills mix that is way below the national average” because of the airport.

The government is seeking to establish university satellites in areas that cannot in themselves sustain an entire university to improve the skills mix.

“Regeneration through education”

“The plan was one of five in the country that were approved but central funding was withdrawn.”

The focus is primarily on IT, engineering, numeracy & leadership skills and customer services and is driven by the existing local employers.

The rate of new business formation in the Crawley area is below the national average and the University feels that there is considerable scope for expansion:

“Thames Valley is full”

“Thames Gateway is falling behind”

“Further expansion along the South coast itself is constrained by a lack of available space.”

“Beyond Crawley, there is very little space available until you get to Southampton”

The University sees the satellites as a way to overcome government quotas on the numbers of life sciences undergraduates and postgraduates

What will be the attitude of the medical school in Brighton?

“Initially they will exhibit characteristic inertia but as the project develops, particularly as funding becomes more visible, they will become more and more interested”

The Vice-Chancellor is interested in developing a nursing school in the UK in conjunction with the private sector.

The university engineering and other groups are very interested in “research into technology that facilitates assisted living for the elderly: IT for keeping in touch, remote telemetry etc”. He suggested that an interesting area to develop might be to use a part of the residential component as assisted living for the elderly and use the population as a clinical trial cohort for telemetry devices etc

Would there be interest in partnering with new private sector employers to participate in the discovery-development-marketing continuum for new compounds/devices?

Very much: the University is clear that this is going to be an important part of their strategy for the future. Their constraints are:

“They have to do it the hard way. Going from one company to the next on an iterative basis. What we want is to be able to deal with an entity that can put us in direct contact with potential partners.”

“We can raise limited funding to get through in vitro and animal studies but always struggle to find mezzanine funding for clinical trials”

There is a large number of universities within the catchment area, including one postgraduate and two undergraduate medical schools. The majority of them regard lifesciences as a key part of their future development plans. These developments are predicated on their ability to increase student numbers as well as to offer a realistic prospect of employment in the area. Furthermore, the trend for the commercial sector to form links with academic centres in order to conduct research as well as to provide internships and placements for graduates and undergraduates alike is growing.

The number of students that a university can attract is determined by central government quotas. Thus, the capacity of these universities to expand is constrained. Increasingly, universities are seeking to develop satellite campuses, focused on a small number of specific disciplines, as a means of circumventing these quotas. The success or otherwise of these initiatives will be determined by the likelihood of the graduates that emerge from them obtaining high calibre jobs in a location of their choosing.

In the course of this study, the project team conducted a number of discussions with key personnel in some of the local universities. It is clear that there is enthusiasm in some circles for the creation of a satellite campus in the Crawley area. The reasons for this are those cited above together with the fact that there is a perception that, whilst unemployment in the area is low, the number of school leavers who go on to higher education and high calibre jobs, as opposed to leaving school at the minimum school leaving age and taking low calibre manual employment, is relatively low. There is a natural political and commercial imperative to attempt to reverse that trend.

The active participation of universities during the development phase of the project will be a pre-requisite for the eventual success of the project. The development company will need to engage with the universities and seek to reach agreements on the establishment of such a satellite campus.

West Sussex as a location for Advanced Healthcare Facilities

Demographics

- Sizeable & relatively affluent population (NE West Sussex – 360,000; surrounding districts in East Surrey, West & East Sussex – 850,000), with 10% increase planned over the next 20 years¹⁰
- Ageing population requiring more healthcare services, particularly in North East of W Sussex. Population >65 will increase by 47% by 2026.¹¹

Local Healthcare Opportunities

- Above average ratio of private health insurance cover.
- Acute hospital provision in West Sussex and East Surrey already running at capacity, which is unsustainable, given projected demographics. 50% of acute in-patients in NE West Sussex go to East Surrey. Widespread community dissatisfaction with current acute & emergency healthcare provision.
- Hurstwood Park Neurology Centre (45 bed) and Queen Victoria Hospital, a major tertiary plastic & reconstructive surgery centre (128 beds) both currently in outdated and inefficient sites, and relocation already considered.
- No specialist cancer treatment centre within 50km of the region.

Higher education links

- Related higher educational facilities in the area include University of Sussex Life Sciences school (800 undergraduates/180 post grads); cutting edge Brighton & Sussex Medical School; and University of Surrey Minimal Access Therapy Training Unit.

Stakeholder support

- General co-ordinated support from local political and administrative bodies across West Sussex is important to deliver for a sustainable scheme to improve healthcare provision and access, and provide high quality employment in associated sectors.

.... & difficulties

- Various public reviews (Fit for The Future, 2007; NE Review Report, 2009)¹² have not supported plans for a new hospital in NE West Sussex.
- Possible sites all have sensitive planning issues for large mixed-use developments.

West Sussex as a location for a Life Sciences Park

Geography

- One of the most prosperous districts of the UK, ranked amongst the most desirable areas to live.
- Less than 1 hour from central London. Direct link by train, and into motorway network.

Local Life Sciences Sector

- Established life science companies in the area include GSK, Novo Nordisk, Schering, Bard, Varian, Treck Diagnostics & Toshiba Medical Systems.
- GSK running down manufacturing operation at Manor Royal, Crawley, but would like to keep strong influence in area > potential anchor R&D tenant.
- Despite the concentration of life science companies in the area, there is not any integrated science park-type cluster.

Higher Education

- Two of the nearest universities (Sussex, University of Surrey) have strong life science departments, but are both more than 20 miles from Crawley & Horsham.
- Planned university campus in Crawley – South East Plan 2007.¹³

Planned Environment

- Planning authorities are willing to consider to science park type developments within restricted planning areas, as long as design is of high quality, sustainable and different, and it can be accommodated within existing infrastructure.
- Crawley identified as 1 of 21 regional development hubs and NE Sussex lies mostly within the Gatwick Sub-Region Strategy Area in which to 'develop a better balanced and more diverse economy' in the (now revoked) South East Plan (2007).¹⁴

But...

- Restrictive investment climate could polarize R&D/biotech development to more established life science locations – Cambridge, M4 corridor etc.
- Planning constraints on available Greenfield sites.
- Gatwick Green could be a rival development.

West Sussex as a location for Ancilliary Development – Conference Centre/Retail/Residential

National & local government policy

- National strategy to allow controlled and balanced development in SE of UK outside of London. Government acceptance of inevitable population increase + concentration of hi-tech investment.
- Expansion in housing planned to accommodate population increase of < 10% over next 20 years. ¹⁵Current population profile in Crawley is relatively young.

Local market conditions & opportunities

- Residential and commercial property prices have remained relatively stable throughout the recent market turmoil, reflecting consistent local demand and limited supply.
- Crawley daytime population 3% more than resident population;¹⁶ rare given commutable distance to London.
- Limited corporate conference centre facilities in Crawley or Horsham.

But still...

- Significant planning restrictions on greenfield sites. No apparent brownfield sites large enough.

Potential Sites for West Sussex Bio City in the Crawley & Horsham areas.

The local authorities participating in the study identified 5 sites within the Crawley District Council and Horsham Borough Council boundaries which could be considered as potential locations for West Sussex Bio City.

While this list is not exclusive, and other locations may be considered, given the local knowledge of the parties, they appear the most probable practical options. They are also quite diverse in nature, and so provide a broad testing ground for the various issues to be considered for a Bio City location.

The five sites are:

1. North Horsham. Land north of A264 has been subject to public consultation as a site for strategic development and is subject to further technical work. Chennell's Brook. The potential development is known as Chennell's Brook.
2. West of West Bewbush. West Bewbush is a site already being developed as a residential community of 2500 dwellings¹⁷ by Crest Nicholson.
3. Pease Pottage & Pease Pottage Hill. Pease Pottage site is 18ha bordered on the West by the Old Brighton Road parallel to the M23, and the north by the A264. Pease Pottage Hill is a 35ha site close by, bordered on the South by the M23, and the East by the A23 leading into Crawley Town centre.
4. GSK site, Manor Royal, Crawley. The only true 'brownfield' site under consideration, the GSK manufacturing plant is currently being phased out of production, and will be available for redevelopment within the timeframe of this project.
Gatwick Green. A site just East of Gatwick Airport that is being developed by a consortium led by Wilky Properties.

Fig. 2 . West Sussex Bio City - Possible Locations

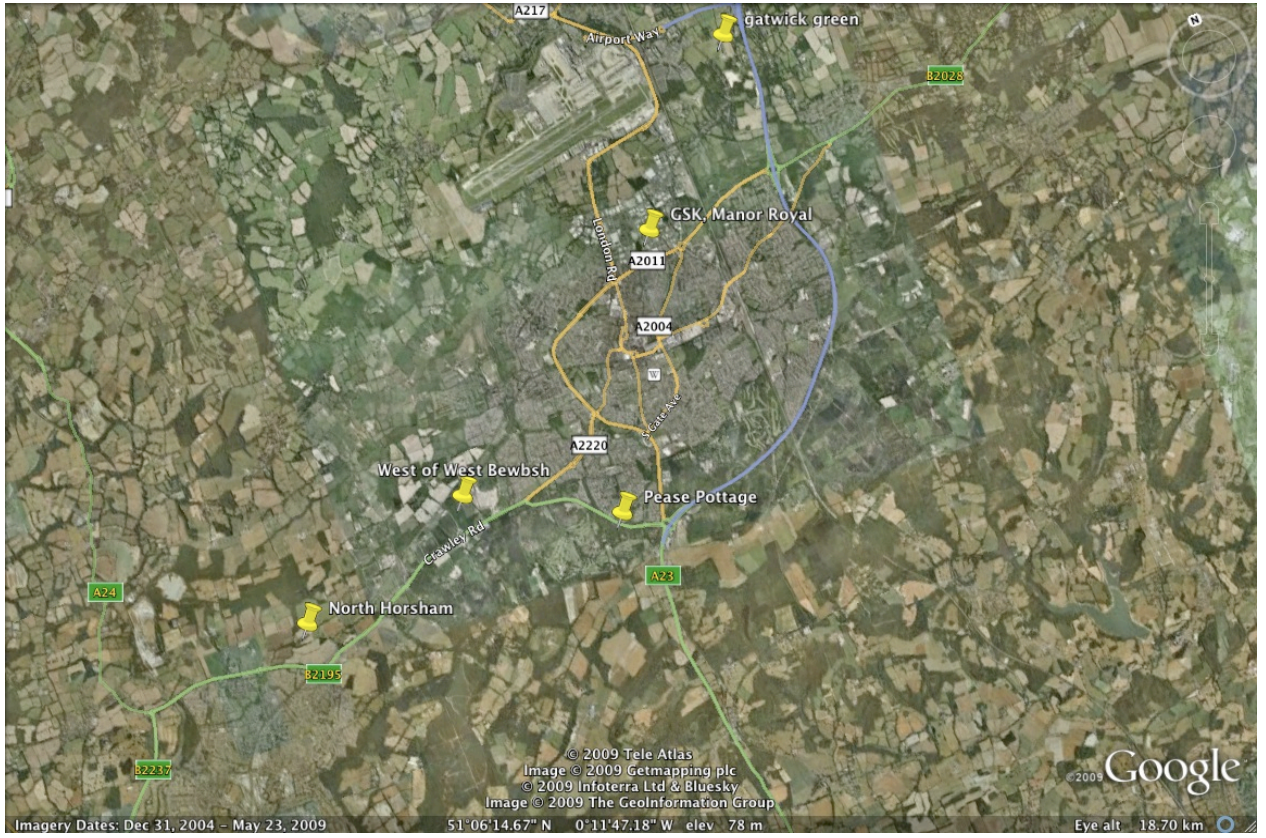


Table 7a. Potential Site Analysis

Location	North Horsham	West of W.Bewbush	Pease Pottage Hill
Borough Council	Horsham	Horsham	Crawley
Size	179ha	130ha (max)	18 ha (Site 1) + 35ha (Site 2) = 53ha
Strengths	<p>enough available land</p> <p>Bounded by A264 dual carriageway, linked to M23; potential for new parkway rail station adjacent to A264</p> <p>Central to NE West Sussex area</p>	<p>enough available land</p> <p>new rail station can be provided, & close to A264 dual carriageway between Crawley and Horsham</p> <p>Focus area for residential expansion</p>	<p>combined sites big enough</p> <p>direct access onto M23 from existing junction</p> <p>Site 1 owned by Crawley Borough Council.</p>
Weaknesses	<p>Flood plain</p> <p>Subject to Horsham expansion strategy. Policy review document expected Q3 2011 + further discussion</p>	<p>Green barrier between Crawley & Horsham > planning constraints</p>	<p>split site</p> <p>Site 1 is Area of Outstanding Natural Beauty > planning constraints and enquiry. Site 2 heavily wooded, so low density only allowed</p>
Opportunities	<p>Quality development adjacent to Horsham</p>	<p>Easily accessible to both Horsham & Crawley by road & rail</p>	<p>Site 2 open for development for acceptable scheme - eg Science park</p> <p>Opportunity for iconic sustainable design to minimise footprint</p>
Threats	<p>Environmental objections - flood plain, greenfield</p>	<p>Adjacent W.Bewbush site approved for residential development. Further residential development may attract opposition from interested parties</p>	<p>Environmental objections - AONB - & planning delays.</p>

Table 7b. Potential Site Analysis

Location	GSK Manor Royal	Gatwick Green
Borough Council	Crawley	Crawley
Size	10ha	65-70ha
Strengths	<p>Brownfield site > easier/quicker planning procedures</p> <p>transport links A2011-M23. Guided busways etc</p> <p>Site owned by GSK > continued interest in community?</p>	<p>site big enough</p> <p>Already owned by commercial developer, with high-tech/educational masterplan in place, hospital under consideration</p> <p>Proximity to Gatwick airport + public transport links.</p>
Weaknesses	<p>site too small for Bio City</p> <p>less attractive, light industrial surroundings.</p> <p>noise from Gatwick airport</p>	<p>Noise from Gatwick airport. Site is directly under flight path</p> <p>Direct Helicopter access not possible</p>
Opportunities	<p>GSK link</p> <p>integrated into Crawley urban public transport system</p>	<p>Co-operation with experienced developers in similar sector</p> <p>Link to Gatwick airport - medical tourism</p>
Threats	<p>noise from Gatwick.</p> <p>Urban congestion at peak traffic times</p>	<p>Bio City would need to take major part of site, which may not be acceptable to master developers</p> <p>Site under threat pending decision on Gatwick airport 2nd runway.</p>

Real Estate development as an enabling factor for West Sussex Bio City

- The outline financial models confirm that an element of real estate sales is a strong enabling factor to the viability of West Sussex Bio City. Indeed the integration of healthcare, medical research and real estate is one of the key concepts of the Bio City model. Revenues from the Science Park are derived from rental of developed space as incubator R&D facilities, and commercial space, and the sale of land to major occupiers to develop their own facilities with the high grade environment of West Sussex Bio City.

Beyond the science park, real estate development options at a site such as Chennell's Brook would be for a mixed residential community, to include affordable housing for key staff working in various capacities at the project. The larger residential/retail development proposed at Chennell's Brook would be integrated to allow WSBC to offer the quality lifestyle proposition that is identified by studies to be so important to a successful medical cluster.

- The real estate development allows positive revenue support to the project during the early years from Science Park land sales and rental while the healthcare facilities build operations into profitability over an inevitably longer period, thus making the whole project financially viable. This also removes an element of commercial pressure for short term returns from the science park by enabling it to retain focus on medical research and related occupiers, thus maintaining the quality and long-term sustainability of the project, and ensuring it remains true to its goals.

- Section III of the report identifies the availability of skilled staff to be the most important factor in the location decisions for companies in the bio-tech sector. One of the key factors allowing for the mobility of staff, or the choice to locate in West Sussex, will be the availability of quality residential property, particularly in an area of high demand and limited supply. This needs to be not only family properties for sale, but also a variety of shorter term accommodation for rent or lease to visiting staff, or those not on the property owning ladder. Such occupiers are generally motivated by the quality of life offered in Bio City-type communities, the proximity of accommodation to the workplace for those who work long and irregular hours, as well as the concentration of like-minded scientists and healthcare professionals that will inevitably occur in such a community, with the opportunities for cross-pollination that this provides.

Including housing within the Bio City development ensures that the appropriate type of accommodation is available to workers. It creates an in-built demand for the residential property developed on or adjacent to Bio City land and limits the effect of extra demand on the already stretched local property market supply.

Once the dynamic of a scientific/healthcare focussed community is created, the desirability of the whole project as a location for the Life Sciences sector increases. This phenomenon is well recognised in the development of residential locations around areas such as Cambridge, UK; Boston, US and Zurich in Switzerland. The mixed housing projects currently under construction adjacent to the Cambridge Research Park and at Biopolis, forms a key part of the integrated development and offer to potential occupiers.

Scale of housing development at Chennell's Brook

- Local authority planning departments indicated that a development of 2,500-3,000 dwellings would be necessary to create a viable community to conform to the authority development plans for the area, and that residential developments below this size would not be favourably considered. Thus whether the housing development is part of WSBC or an adjacent development, this scale of housing is anticipated as being acceptable to the local authorities.
- The size of Chennell's Brook site means that it is possible to develop WSBC, alongside the larger residential development and retail while retaining an open park-type environment over the whole site.
- Bio City plan to include a site wide public transport system, (eg electric trams), underground parking etc to create a highly attractive sustainable environment (to BREEAM Excellent or similar standards)
- Development of North Horsham is likely to be considered comprehensively by local authorities and would therefore include an adjacent site of 120 acres as part of the overall mixed use scheme which could include further science park space for Phase 2 if there is market demand.

Site Analysis Summary

1. North Horsham. Horsham District Council Policy Review Document indications were viewing North Horsham site as one of the most favourable sites to be developed to provide the quota of residential developments as required by the Horsham District local Development Framework¹⁸. This was due to be announced in September 2010, but has recently been delayed for a year. The land developer believes that the objections to construction in a flood plain area can be overcome. There is further potential land available for West Sussex Bio City in addition to the residential development, and this could be progressed while the moratorium on the residential development continues. Thus the possibilities of an integrated mutually beneficial development are real. The land availability and value indicates that a financially viable project can be developed on this site. It thus currently appears to be the preferred site, though more in depth analysis is required.
2. West of West Bewbush. West Bewbush is a site already being developed as a residential community of 2500 dwellings¹⁹ by Crest Nicholson. The local authorities have strongly suggested that the current transport links and their planned enhancement for the West Bewbush development will bring them to their maximum capacity, so do not see that any further strain could be put on them by allowing an adjacent development. In addition, the encroachment onto the open

countryside between Horsham and Crawley means that this site is discounted as a potential development site.

3. Pease Pottage & Pease Pottage Hill. These 2 sites were initially favoured having been subject to extensive previous studies to site a hospital on the council-owned land at Pease Pottage. However, being an Area of Outstanding Natural Beauty, full planning permission is likely to be problematic. In addition, the Pease Pottage site, on which the bulk of the science park and supporting real estate would be located, is not immediately adjacent, and is designated as Ancient Woodland, so will also have its attendant planning issues. Resolving all of these planning issues will likely take some considerable time, and include a level of risk that may compromise the design and subsequent viability. Thus while this site is not dismissed, it is problematic.
4. GSK site, Manor Royal , Crawley. While the planning issues are easier for this brownfield site, the GSK site itself is not large enough to accommodate a viable Bio City project. If more land became available in the Manor Royal area, or a larger separate brownfield site, then this could be reconsidered as an option.
5. Gatwick Green. Being under the flight path of the main Gatwick Airport runway means this site is a wholly unsuitable for a hospital. The developers well developed current plans would also not be able to accommodate a Bio City development. Thus Gatwick Green is not considered an option.

In conclusion, the report recommends that North of Horsham and Pease Pottage have so far been identified as the most viable sites in the Crawley/Horsham area, with the proviso of considering Manor Royal, or another brownfield site, if more land became available. Furthermore, these sites were taken as examples of different sight types. A more extensive survey of the whole area needs to be taken at the next phase to ensure all possible sites have been identified and considered carefully.

Study Section Research Status: Interviews

Completed Interviews:

- GSK
- Local authorities
- Surrey, West Sussex, East Sussex Downs & Weald, West Kent & Hampshire PCT's;
- South East Coast & South Central SHA's;
- Royal Surrey County Hospital, St. Peter's Hospital, East Surrey Hospital, Queen Victoria Hospital, Princess Royal Hospital, Royal Sussex County Hospital, St Richard's
- Varian Medical Systems
- Roche Diagnostics
- University of Brighton
- University of Sussex

Key Interview Questions:

- What is your view of existing supply and demand in your field of expertise?
- Where is there a supply gap that the local authorities could help to fill through support for new developments?
- Are there adequate local support mechanisms in place to make new developments possible?

Survey of GP's in the West Sussex PCT

Methodology

A survey was undertaken of all of the general practices in the West Sussex PCT.

The practice manager of each practice was contacted by email with a simple questionnaire.

The questionnaire was pasted into the body of the email and a pdf form was attached to the email along with a covering letter and the letter of introduction provided by the three local authority chief executives.

The email was followed up with a phone call.

A substantial majority of the practice managers with Crawley or Horsham postal addresses were interviewed for between 10 and 20 minutes.

Those who had not already responded to the questionnaire were first read its contents and asked for their responses.

Once, the questionnaire had been completed, they were engaged in conversation about their subjective attitudes towards the project.



B I O C I T Y D E V E L O P M E N T C O M P A N Y

Dear Sir or Madam,

Bio City Development Company (BCDco) has been commissioned by West Sussex, Horsham & Crawley District councils to conduct a study examining the feasibility of building a new full service acute hospital, including an A&E department, in your area. I have attached a letter of introduction from the chief executives of the local authorities involved which gives a some background on our group and the aims of the project. You have been contacted along with all of the general practice managers in your area and, whilst I am sure that there are many calls on your time, I would be very grateful if you would spare a few minutes to answer a two questions related to the project.

You may answer the questions by replying to this email or use the attached form, whichever is the more convenient.

Should you wish to contact us regarding any of the aspects of this survey, please do not hesitate to do so, using my email address. Please be assured that any answers that you give will be kept strictly anonymous and confidential.

With kind regards

Yours faithfully

Jullien Gaer
Chairman

1. Do you think that there is a need for a new acute services hospital, with a 24 hour A&E department, in your area?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

2. With the following extract from "The Coalition: our programme for government" in mind,

• We will give every patient the power to choose any healthcare provider that meets NHS standards, within NHS prices. This includes independent, voluntary and community sector providers.

If a new full service privately owned, acute hospital (with a 24 hour A&E) were to be built in a location that was convenient for your patients, would you (please tick, as appropriate):

encourage patients to use the hospital	<input type="checkbox"/>
discourage patients registered from using the hospital	<input type="checkbox"/>

3. If you would discourage patients from using the hospital, please state your reasons.

--

Survey of GP's in the West Sussex PCT

Results

48 practices were surveyed

18 responded by email

A further 5 practice managers were just interviewed by telephone (Horsham & Crawley postcodes, including those who had already responded by email)

Of the 23 practices that responded, either by email or by phone, none was 'ideologically' opposed to the idea of NHS patients using a privately owned hospital.

All were adamant that there was a clear need for a hospital based on geographical convenience and the poor reputation of the existing provider.

Interview with Ms. Sarah Creamer (Director of Planning & Governance) & Mr. Paul Trevethick (Area Director Primary Care Development), West Sussex PCT

The interviewees confirmed that a review undertaken by the PCT had confirmed their view that there was no need for a new acute hospital in the Surrey/ the northern quarter of West Sussex.

They felt that although patient access was not ideal, capacity is adequate and the PCT's preference would be to see further investment in community hospitals

They felt that there could be an opportunity for a privately provided health campus project providing some specialist acute services (diagnostic imaging, oncology & renal dialysis). They would encourage "alliances" with UK & international specialist providers of outstanding repute.

They drew attention to the fact that there are currently no linear accelerators in the county and confirmed that patients would prefer not to travel.

"If you were to provide a world class provider, we would welcome the choice"

Patient Choice and Emergency Access to an A&E hospital in Crawley/Horsham area

The updated version of the financial model highlights the revenues that can accrue from A&E and out-patient services.

There is little precedent for privately operated A&E units (Circle Group, Brentford)
The recently published government White Paper on NHS reforms underscores the commitment of the government to ensuring that all patients have access to any provider that conforms to NHS tariffs and standards.

A&E departments can be important “loss leaders”. At full capacity, an A&E unit in WSBC can expect to see some 85,000 patients per annum. This is an important source of patients for in-patient and continuing care.

The key to the success of the A&E will be the relationship with the ambulance services. There are no legal encumbrances to prevent the ambulance service using a private A&E department, whose obligation as an NHS Trust is to take patients to the nearest facility that provides the required acute care.

The ambulance service’s prime interest is to complete the safe transfer of a patient as rapidly as possible so as to enable the ambulance and crew to be available again. Travelling from the Crawley/Horsham area to East Surrey Hospital as is generally the case for current A&E admissions increases this time considerably.

There is an opportunity for WSBC developer to work closely with the ambulance authority, local GPs and other stakeholders to craft an efficient A&E department that serves the needs of the area.

“We will give every patient the power to choose any healthcare provider that meets NHS standards, within NHS prices. This includes independent, voluntary and community sector providers.”

Section II - Conclusions

- The success of a new acute hospital in the Crawley/Horsham area will depend on its ability to compete with existing providers by providing the right services in the right location. It may improve the current poor performance of existing acute hospitals in the area by increasing capacity and necessitating an efficient re-allocation of resources.
- Crawley is an attractive location for a university satellite campus, especially one focused on technology transfer in the life sciences. Universities will benefit from co-operation with WSBC to co-ordinate approaches to private sector employers and funding entities. The natural synergy between education and innovation can here be capitalized upon to create more jobs through both blue chip tenants (who are attracted to the qualified and young labour pool) and young-start ups which have been spun off from the university campus.
- The availability of quality residential space in close proximity to WSBC is important to attract quality staff. WSBC must itself be a community, much like many university campuses, and not simply a commercial area.
- Of five potential locations studied, North Horsham and Pease Pottage Hill seem most feasible and worthy of further study.
- Local GPs and healthcare professionals acknowledge that a private world class hospital with an A&E dept providing services within NHS prices would be welcome in the area.

SECTION III

BIOMEDICAL CLUSTERS OR SCIENCE PARKS: DEVELOPMENT AND INVESTMENT DRIVERS

Introduction

Every successful Science Park - from Research Triangle in the United States to Technopol in France - has an organization that “owns” or “leads” the entity. In every case, public sector support is an essential element of success with inducements ranging from grants and tax relief, to funded infrastructure development.

Stanford University created the first modern “Science Park” in the early 1950’s and subsequently demonstrated that a successful park creates an environment in its locality which conveys enterprise, success and quality. This image attracts companies of excellence wishing to share such an encouraging ambience

Science Parks have developed and multiplied worldwide since that time, both in Western and in developing countries, including those of the former Eastern Bloc, and they tend to share a number of features which are incorporated in the United Kingdom Science Park Associations. According to this definition, the term Science Park is used to describe a property based initiative which:

- has formal and operational links with a University or other higher educational institution or major centre of research;
- is designed to encourage the formation and growth of knowledge based businesses and other organizations normally resident on site;
- has a management function which is engaged in the transfer of technology and business skills to the organization on site;
- may include initiatives called by other names e.g. Research Park, Innovation Centre, High Technology Development, etc., where they meet the essential criteria set out above.

Model analysis

There are at least four distinct models of development for science parks.

Field of Dreams: The traditional model has often been called the “Field of Dreams” approach - ‘If you build it they will come’. This has been the Dubai Health Care City model amongst others. The problem with this model is that, for most locations, they do not come. People do not want to move without a compelling reason. Even with tremendous incentives, if a company is not integrated into its new location and does not establish roots, then it has just as much incentive to move out again if a better offer from a competing location is made. This leaves such a park very susceptible to competition.

Real Estate Model: The real estate model is a variant of the “Field of Dreams” approach: a piece of land is consecrated for the purpose and tenants should come. The problem with

the approach is a lack of the vertical integration that is necessary to ensure technology transfer.

Advanced Research Centres: Another model has been to establish and promote great advanced research centres / infrastructure with the expectation that this will lead to new commercial products and new commercial enterprises. What tends to happen with this approach is that there is not a mechanism to get the technology out of academia into the commercial sector. Therefore, while you may foster a collection of institutes of research which may enhance their academic reputations, they do not add to their commercial capability. This model has been seen in some parts of Singapore.

Venture Capital Model: The fourth model has been the private sector venture capital model which has a reliance on a venture capital company to find good technology and to start companies. This worked well in the early 1980s in places like Palo Alto, CA, and Cambridge, MA, in the United States. In these situations venture capitalists were willing to take a long term perspective and back emerging technologies, but this has been seen to be a variable approach often driven by short termism and fund criteria rather than by broader business and sector considerations.

The PPP model described in this Study can be understood to be the replacement of these four prior models.

Target anchors for West Sussex Bio City

In order to avoid some of the problems of older science parks which did not follow the PPP model, in addition to their clinical relevance, the anchor tenants in West Sussex Bio City must meet the following selection standards:

- Be worldwide leaders in their field;
- Be run as successful enterprises with a surplus of revenues over expenses;
- Be engaged in teaching, training and public education.

On the clinical level, candidate parties are centres of excellence of international renown seeking to establish a presence in one of the fastest growing economies. These centres are expected to provide:

- Quality assurance;
- Clinical leadership and supervision of local medical, nursing & paramedical staff;
- Faculty staffing;
- Faculty and curriculum for CME;
- Training opportunities for medical, nursing and paramedical staff at home institution;
- Participation in collaborative research projects.

Barriers To Entry

Introduction

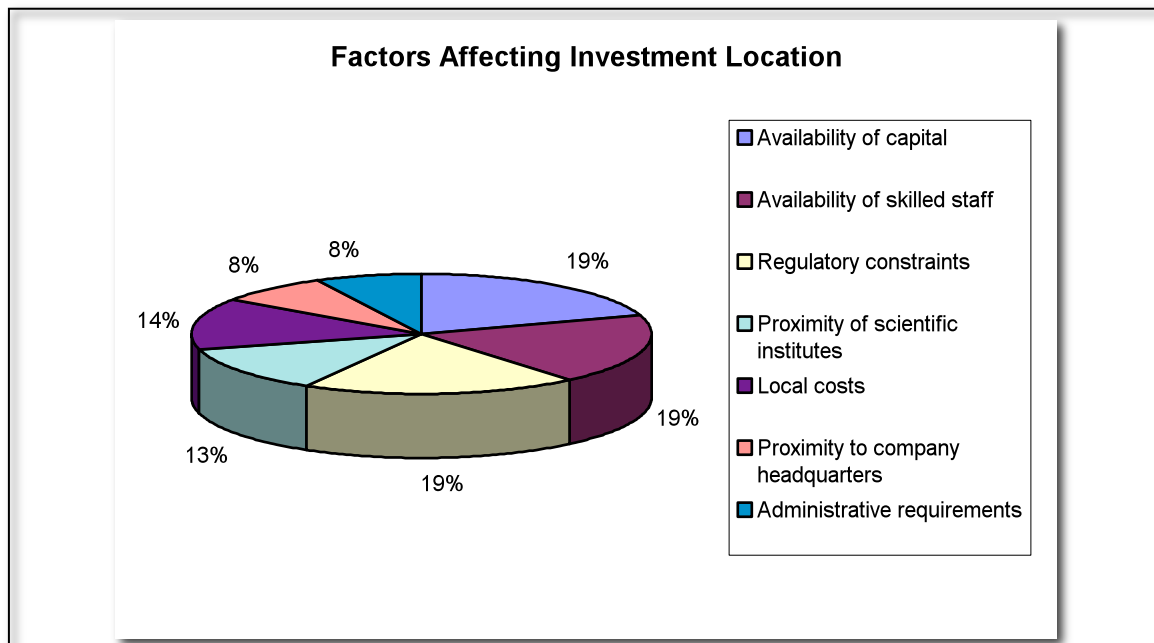
Having established the nature of the supply environment as well as the companies that would be attracted to the Bio City and having reviewed the market position to ascertain the appropriateness of this choice, the next factor to consider relates to barriers to entry. The research undertaken to look at communal barriers to entry is three-fold:

- Several relocation agencies were contacted to get an overview of the factors taken into account when considering relocation
- We also interviewed 5 leading pharmaceutical companies on their reasons for opening/closing facilities in the EU, their drivers in making a regional choice and their identified barriers to entry
- Lastly, we interviewed extensively some of the candidate academic partners for their view of project challenges.

Relocation and decisions on investment

The following table illustrates that company decisions on the location of an investment take many forms and involve many factors. The survey demonstrated the most important factors in corporate location decision-making.

Fig 3. The most important factors affecting investment location decisions²⁰



By far the most important factors influencing decision-making on location of investment in any global region are the availability of skilled staff and the ability to work within the regulatory structure of that region.

The factors identified, and their importance, imply that direct costs cannot be a key criterion, and although costs are never unimportant, they are not the main driver in the location of a biomedical-related investment. In most circumstances, it is the search for certainty which is the key to investment decision-making.

Feedback from the pharmaceutical industry and academic partners

Following on from this, our interviews with operating pharmaceutical companies and academic partners produced results that were more sector specific. From the outset it became clear that there were certain issues that all regarded as priorities, these were:

- Political Stability
- Prohibitive import tariffs
- Intellectual property protection
- Common regulatory procedure
- Capital and labour costs
- Skills availability

Each of these factors is assessed individually and potential solutions highlighted for their application in the context of West Sussex Bio City.

Political stability

The United Kingdom's political stability, rapidly improving overseas image and successful campaign to attract regional and global headquarters mean that it is increasingly seen as a desirable location for companies and employees alike.

There are a number of measures and analyses used to calibrate and measure the range of 'risk' factors. Using Standard and Poor's Sovereign Credit Rating and the A.M Best's Country Risk and Tier Assignments,²² the United Kingdom scores very high.

The Standard and Poor rating is a qualitative and quantitative assessment of a sovereign government's credit worthiness and reflects their ability and willingness to service their commercial financial obligations in full and on time. Some of the most important factors influencing these ratings include: economic performance, fiscal performance, government debt and borrowing, external liquidity and political risk. A.M. Best's rating of country risk is utilised by organisations such as insurance companies to determine how the factors outside a company's control affect its ability to meet its obligations. The ratings include an assessment of local accounting rules, government policies and regulations, economic growth and social stability. The output of the rating takes the form of a 5-tier scale based on each country's level of risk (I-lowest risk, V-highest risk). The rating methodology also

incorporates a weighting system which factors the arrangements made by individual companies to mitigate risk, such as diversifying invested assets beyond the local markets.

Overall, the key takeaway is that the United Kingdom presents a stable and secure (at worst) environment in which to operate and certainly does not present any significant or specific issues to biomedical investors looking to establish or build their presence in West Sussex.

Tariffs

While it is important to recognize the negative impact of protectionist tariffs, it is possible to minimize this restriction on free trade by providing a qualified incentives package that includes certain “free-zone” type benefits for West Sussex Bio City. This would by-pass tariff considerations to other countries, most notably emerging markets.

The restrictive tariffs are generally encountered in countries that have the largest populations and are therefore the most attractive to investors. Notwithstanding this, it will be possible to reverse this negative aspect by promoting West Sussex as a longer term strategic location to access the expanding future emerging markets.

Intellectual property protection and regulatory procedures

The presence of robust intellectual property protection has hitherto been a major supporting factor to medical companies wishing to invest within the region.

The eighth Uruguay round of the General Agreement on Tariffs and Trade (GATT) talks resulted in an agreement signed by the majority of the world’s countries. Part of the agreement is an improvement in intellectual property protection, which includes pharmaceutical process and production patents. This increased protection allows developed world multinationals to sell their products in developing countries without fear of the generic and copy-product competition that has made many of the markets unattractive until recently. Products can therefore continue to be developed in places like West Sussex Bio City without later risk of sales blockage in the emerging markets.

Capital and labour costs and availability

As with any business the primary objective is maximizing profit margin and this is the reason why tariff barriers, intellectual property, regulatory diversity, limitations on ownership etc. are such major obstacles to attracting successful inward investment. It was therefore not unexpected that the interviews revealed that capital costs involved in setting up new facilities together with the cost of relocating (or buying in) key personnel was paramount in any location decision, given the positive position of the UK on other fronts.

There is a well structured property infrastructure in West Sussex with competitive property rates available. There is, however, a major cost in providing the relocation package. West Sussex Bio City having its own housing stock will help in this process.

As illustrated above, the estimate that the number one consideration in a location decision was the availability of skilled staff. We need therefore to emphasize the development of an appropriate educational regime in the long term and explore ways of attracting skilled personnel in the short term.

The immediate issue of providing skilled labour and attracting value added business to the project has to be addressed. One way of doing this is to provide an appropriate personal incentive package. This can help to ease the burden on larger pharma companies that may have concerns, or meet resistance, in moving key personnel. It can also act as an investment driver to smaller less labour intensive companies considering relocating (as a unit) to the Bio City.

The longer term solution to this is to use the growing healthcare community as a base to link to a sector specific university campus affiliated to a prominent overseas university as is proposed for West Sussex Bio City. This will provide a significant component of the necessary advanced skills infrastructure to accelerate the development of the commercial base. As has been described in this study, the Bio City concept is specifically designed to attract world-leaders in biomedicine.

Flat infrastructure

There is a concern by healthcare companies that if they invest in an area of limited healthcare infrastructure they will be operating on a flat, non-expansive basis. i.e. there are no smaller companies to act as suppliers, no graduates to fill vacancies, no larger companies to sell to or joint venture with locally, in other words that there is nothing below or above them.

It seems therefore that the desire of West Sussex government to have a multi-layered healthcare community is shared by investors themselves.

This convergence of state and industry thinking can be realized if the support necessary for education and industry is forthcoming for West Sussex Bio City. To start, this could take the form of focused education and training packages delivered through an enhanced local university and a structured incentives package for industry (with possible tax benefits maximizing high level foreign investment).

Key Medical Personnel in a West Sussex Bio City

Introduction to Incentives

Eliminating the barriers to entry can effectively provide a level playing field on which West Sussex Bio City can compete with rival locations for foreign direct and local internal investment. The actual process of attracting the WSBC-associated projects will involve the use of an appropriately structured and marketed incentives and benefits package.

An appropriate incentives package consists of two main components: personal incentives that deal with quality of life issues for the individual, and corporate incentives that can take the nature of property, capital, tax and trading concessions. Because high-quality biomedicine is such a global field, it is important to approach this section from a global perspective where we try to understand what will make the global leaders in medicine, from many countries, take part in West Sussex Bio City.

Personal Incentives Detailed

Entry back employment

One of the major concerns for individuals is that, on completion of a period of employment in West Sussex, it will be very difficult to gain a comparable position on return to another institution. Indeed the time spent in the UK, at a new cluster, may be misunderstood and will hamper long term career options. This concern points to a need to at all times brand West Sussex Bio City as a world-leading biomedical cluster, not a project under the shadow of London's more established parks.

Length of Contract

It is generally considered that an appropriate minimum contract would have to be available before employment at West Sussex Bio City were considered a viable option. The packages would also have to reflect the status of the individual concerned. If the candidate were a senior scientist then this may be viewed as a more important career choice and provision to retire or remain would have to be considered, this would contrast with a post-doctoral student, where a two to three year contract would be viewed as ideal.

Accommodation

Assistance in this area can take various forms, it could entail subsidized accommodation in the area. Most importantly, it will include housing on campus, purpose built as a part of the Bio City.

Flights

It is necessary to provide subsidized travel for employees and their dependents. This neutralizes the isolated feeling that can affect many families in biomedical clusters. An extra incentive is to provide a limited number of free flights.

Education

Families expect a comparable level of education provision for their children, therefore education on a primary and secondary would have to be demonstrated to be of a high standard locally. Assistance with placements at secondary school and universities is desirable.

Spouse Employment

In many cases spouses of quality personnel are of a professional background and can suffer greatly from the enforced layoff caused by relocation. The World Bank has pioneered a program which assists spouses of Bank personnel to secure an appropriate professional position in the country of placement. This was seen by all as a superior approach and worked well in practice.

Social and Leisure

In common with climate issues, this is an area that is frequently cited as being of concern but not critical.

Healthcare

A high-quality healthcare plan is a standard part of most relocation packages, in this case to be linked with the Bio City's comprehensive medical services.

Climate

Somewhat surprisingly this was relatively highly rated in the survey and although on discussion it was never thought of as a decision making element it nevertheless was of concern to some individuals. There is, of course, nothing that can be done to alter the climate but the ready availability of, high calibre housing, transportation and an appropriate range of leisure facilities can help all personality types to adjust.

Political Uncertainty

New personnel are less concerned by political reform than they are by issues of personal security and the safety of their families. There are very few concerns on this front in West Sussex.

Recognition

Many skilled staff feel that any work done in a UK satellite campus will not hold the same weight, or gain them the recognition of comparable work done in downtown London or Boston. Here again, the quality of the project is the key to ensuring that this does not occur.

Corporate Incentives Detailed

Corporate Incentives

It will be necessary to customize the assistance available to ensure any package is attractive in the international healthcare markets. The package available to an individual company would be bespoke but would have certain core elements e.g. property assistance, financial assistance, tax concessions, free-zone benefits, training and education provision, innovation grants and assistance with intellectual property costs.

Property

This could range from advanced design and build to rent free concessions, capital incentives and fit out services to a total turnkey package together with local regulatory, planning and permitting support.

Financial Assistance

One of the major attractions to locating in West Sussex would be the availability of development capital for companies. This could form a mix between commercial and grant finance. The grant package available could cover innovation assistance, research grants, production awards, general capital expenditure-related assistance, long term loans, and equity.

Tax

The tax structure needs still to be examined in detail.

Intellectual Property Rights (IPR) Support

The United Kingdom has an opportunity to capture some of the business that currently migrates to the US from Continental Europe because of its more favourable legislative framework. Support for IP costs (e.g. patenting and legal defence) would be both novel and imaginative, assisting in the attraction of biotechnology business to West Sussex which would, in turn, smooth entry into the other markets

Section III – Conclusions

- The PPP model proposed for WSBC reflects the evolution of Science Park models over the last 50 years and is financially the most stable to offer to investors and lenders.
- The most important variables for bio-medical companies choosing a location are the availability of skilled staff, and the applicable regulatory constraints.
- A high quality of life environment is essential to attract and retain skilled staff, while the necessary stable and supportive corporate environment would be present at West Sussex.

Study Section Research Status: Interviews

Completed Interviews:

- Relocation agencies including HSBC and ID
- Merck Pharmaceuticals
- Pfizer Inc.
- Novartis
- J&J
- GE Healthcare
- NHS Trusts

Key Interview Questions:

- What are the personal incentives which have lured you to, and kept you in the South East region?
- What are the corporate incentives which have made a difference to your company?
- What do you feel is currently missing?

Interviewer Pitch:

BCDco, in cooperation with the local authorities, is assembling a study of existing healthcare and biomedical research space supply in the South-East of England. Key backers of the study include Horsham District Council, Crawley Borough Council, West Sussex County Council. As a part of the Study, the authors are seeking to understand existing stakeholder views of local supply and demand in order to ensure that any new developments in the region do not in any way duplicate supply. The study will be used to recommend to regional authorities whether development programs should be initiated in the area. BCDco would appreciate your anonymous contribution to this effort so as to create the most effective supply recommendation. References from local backers of the Study are available on request.

SECTION IV:

CASE STUDIES & BENCHMARKING

Case Studies & Benchmarking

The purpose of this section is to offer a series of case studies and derived benchmarking which will provide substantive answers to the following questions:

- Are the key attractor elements present in West Sussex to a degree that key tenants can be lured away from other parks worldwide?
- Does West Sussex Bio City require a housing component?

The science park market, on a global basis, offers a wide diversity of options. A broad range of science parks exist including university and laboratory-based parks as well as the large-scale industrial models often undertaken in Europe and Asia. Overall, the aim of the science parks is to develop a park of significant scale and scientific and innovative potential. In most cases, the benefits of such parks go beyond regional development and job creation, their role is also to put the countries on the world stage.

BCDco and its partners have reviewed some of the leading science parks across the globe to investigate the best practice from a development point of view. These include parks at different development stages (planning stage and built) across Europe and Asia. Parks in China were also included in the benchmarking exercise in order to identify best practice in key emerging markets.

The benchmarking exercise has three functions in relation to determining the best practice to be adopted for WSBC:

- Comparative performance;
- Type of buildings;
- Phasing of buildings.

The comparative performance includes factors such as connectivity, size of science park, security, rent and relationships with hospitals and universities. The types of buildings have been determined from assessing the relevant websites and discussions with contacts that have close ties to the science park. The phasing is a more complicated exercise as some parks have been established for many years. However, an estimation has been calculated for some parks for the first year of operation (the point at which the park was deemed to be 'established') and subsequent five-yearly time periods from this point of establishment. A review up to, and including the 20th year, was assessed, where appropriate. A 20-year assessment was only applicable to four parks.

As some of the science parks benchmarked are at planning stage, only accessibility benchmarking measures were used to compare parks as the facilities and lack of built stock would result in artificially low scoring.

Overview of the benchmarked parks

In total, 22 science parks were assessed:

National Technology Park, Ireland
TechnologyZentrumDortmund and Technologiepark Dortmund, Germany
Adlershof City of Science, Germany
Parc Cientific de Barcelona, Spain
Sophia Antipolis Park, France
Genopole, France
Biotech Centre Zurich, Switzerland
Technopark Zurich, Switzerland
Cambridge Science Park, UK
Oxford Science Park, UK
Surrey Research Park, UK
Biopolis, Singapore
Gyeonggi Technopark, South Korea
Zhongguancun Science Park, China
Tuas Biomedical Park, Singapore
Shanghai Zhangjiang Hi-Tech Park, China
Dalian Ascendas IT Park, China
Hong Kong Science Park, China
Shenzhen High Tech Industrial Park (SHIP), China
BioBay, China
Hsinchu Science Park, China

In setting the benchmarking exercise, BCDco and its partners selected what are, in its opinion the 'best' science park examples in the relevant country. The science park models in Europe and the Far East provide excellent comparables to the development in West Sussex. Science parks in the Far East were particularly important in this analysis as they have developed considerably over a shorter time period. The Chinese parks in particular have been one of the foremost practitioners of science parks for regional and economic strategy. A central theme of China's Five Year Plan has been technological progress. As a result, the absolute number and scale of Chinese science parks has been remarkable. The benchmarking has considered a variety of science park types, including those with a more industrial bias. They include:

Zhongguancun Science Park, Beijing;
Shanghai Zhangjiang Hi-Tech Park;
Suzhou Industrial Park.

The Zhangjiang High-Tech Park, is a good example of how aggressive intervention by national and local governments to create a large-scale park, has succeeded. The park began from a clean slate and multiple research institutions were encouraged to locate there and team up with R&D centres of multinationals to anchor the park. University links to Shanghai

Jiao Tong University and Fudan University contributed to the 8,600 strong workforce and enabled the government to meet its technological progress targets.

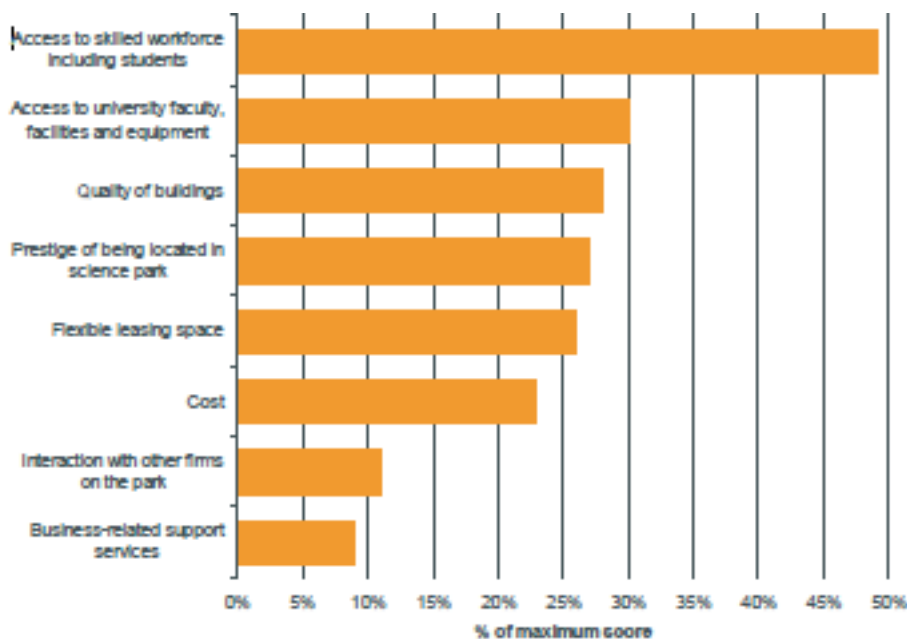
Types of companies and the rationale for occupiers being on a science park

The common purpose of science parks is the commercialization of science and technology. There will be some companies that try to exploit proprietary technology. However, it is more common to see organizations on science parks that are involved in merging their technology with technologies that already exist in the market place.

Science parks will also attract organizations that are described as ‘value added resellers’ that take technology and add value to it before reselling it back to the market. For example, a small pharmaceutical company licensing technology from a larger pharmaceutical company and to which they then add value by securing regulatory approval and then secure a commercial benefit by reselling the technology back to the industry.

As shown in Figure 4 below, the primary reason why tenants locate in a university research park is to access a skilled workforce, including students. Nearly 50% of respondents indicated that access to a skilled workforce was of ‘very high’ importance to tenants. Other attributes of a university research park that are important to tenants are the quality of buildings; the prestige of being located in a research park and access to university. These are all factors that WSBC must consider.

Figure 4. Reasons why tenants locate on science parks²³



Experience also shows that Contract Research Organisations (CRO) are commonly found on science parks. For example, a clinical trials company that offers its specialist services to the pharmaceutical industry. This type of occupier has become more common during the past decade.

According to the Association of University Research Parks (2007), presenting the North American experience, science parks are being viewed more as an expression of commitment to economic development. In the past; many research parks were primarily viewed as a passive real estate investment with limited university involvement or presence. Two-thirds of respondents indicated closer involvement by university leadership and more emphasis on university involvement in the past 5 to 10 years.

AURP also presented the employment types typical to US science parks. This shows that IT-related employment is as important as the more 'traditional' R&D activities.

Benchmarking variables assessed

The variables collected, where possible are presented in Table 8 below. Those cells highlighted in blue are the variables that were scored to create the rankings of the science parks as shown in the following graphs.

Table 8. Benchmarking variables²⁴

Location	Descriptive Information
Date established (year)	Phasing of current built stock (sq ft & sq m)
Developer/owner/funder	Phasing of future additional stock
Website address	Types of space/buildings:
Transportation/Connectivity	Laboratory space (sq ft & sq m)
Major international airport access (miles & kilometres)	Office space (sq ft & sq m)
Motorway (or equivalent) access by car (miles & kilometres)	Manufacturing/distribution (sq ft & sq m)
Proximity to large town/city centre by car (miles & kilometres)	Percentage splits
Proximity to major hospital (miles & kilometres)	Number of occupiers
Proximity to major academic institution (miles & kilometres)	Number of jobs
Park & Building Specifications	Areas of activity
Built stock (sq ft & sq m; current)	Sustainability/energy efficiency credentials (e.g. LEED, BREEAM equivalent)
Further potential future stock (max; sq ft & sq m)	Facilities for tenants (e.g. cleaning equipment, cold storage)
Incubation facility	Tenant company incentives available (e.g. tax breaks)
Average age of buildings	Any element of mixed-use
Floorplates (max available; sq ft & sq m)	Build density
Security of site (e.g. patrols, CCTV etc)	Car parking facilities (number of spaces)
Number of leisure/retail amenities (e.g. shops, creche etc)	Hospital relationship?
On-site management (e.g. park manager)	University relationship?
Tenant Options & Cost	Residential provision
Freehold/leasehold/site sale/built-to-suit	Land area (acres & hectares)
Current top quoting rent (\$ per sq ft & sq m)	Notes

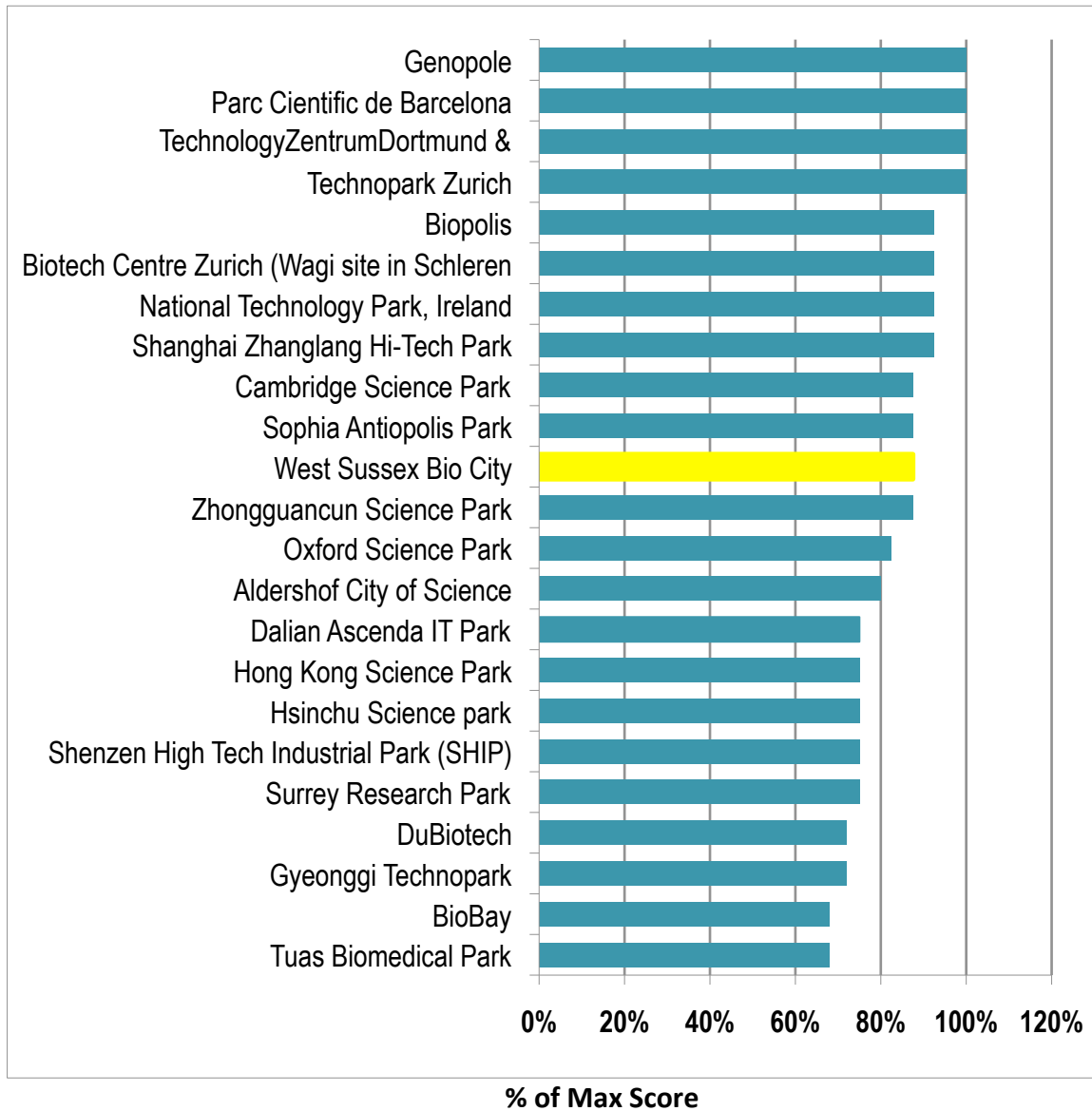
Before reviewing the results, it is worth pointing out one surprising aspect of the benchmarking process. It was curiously difficult to find out details for some of the established parks. There is a lesson to be learnt in that the plans and offering for WSBC must be clear at all levels of enquiries, for potential occupiers and other organizations.

Benchmarking results

Without any built stock, it is not possible to include WSBC in the whole benchmarking process. However, from a transportation/connectivity viewpoint it is possible to show where WSBC would sit in comparison to best practice from around the world. In most countries there has been a government commitment to develop a first-class infrastructure, this includes the transportation network.

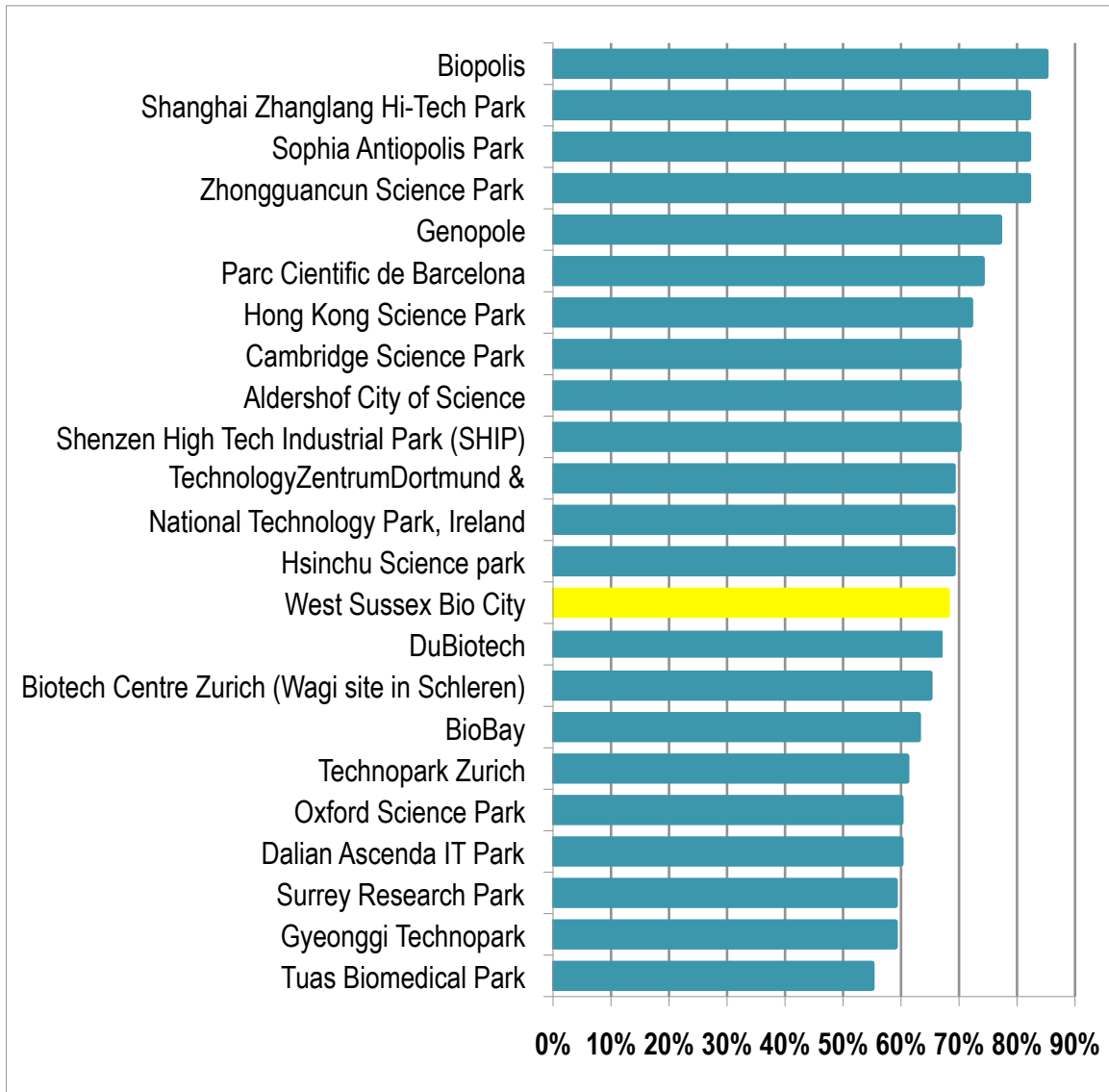
An overview of the transportation/connectivity assessment is shown in Figure 5 below. Note that parks that score the same are in no particular order, i.e. the top four. The percentages represent the proportion of the total score achievable. It is encouraging to see that WSBC is in 9th place of the 23 parks. This shows that WSBC has good foundations for becoming a renowned science park.

Figure 5. Transportation/connectivity variables only²⁵



The following chart illustrates the benchmark scoring based upon the 14 variables highlighted in Table 8 above. This shows that Biopolis in Singapore is the ‘best’ science park. The lowest scoring is Tuas Biomedical Park. However, with a percentage score of 54%, this is still a good score. Exceptional parks are above the 70% level. A third of the parks exceeded this threshold, which underlines the quality of the parks chosen for this analysis.

Figure 6. Benchmarking results for 'all' scored variables²⁶



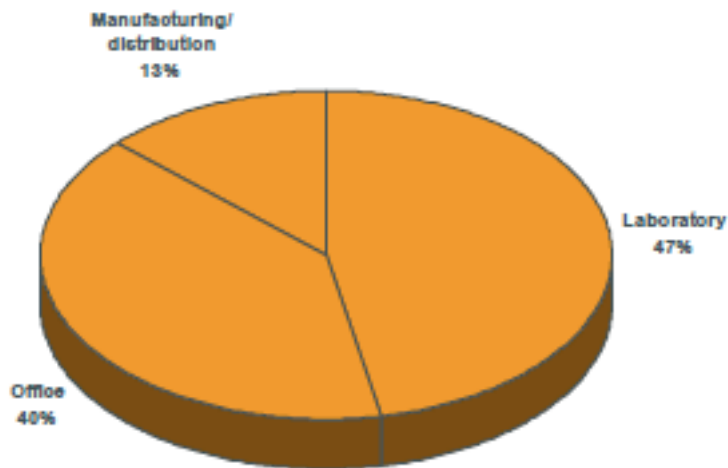
% of Max Score

The rationale for carrying out the benchmarking can also be used to inform the masterplanning / costing process for WSBC. The benchmarking assists in illustrating the types of buildings and phasing of these leading global science parks (not including housing). This is illustrated in the next graphs.

Type of buildings

The average proportion of space allocated to different uses across all the parks assessed, where the data is available, is shown in Figure 7 below. It is unsurprising to see that the largest proportion of space is assigned to laboratories. The percentages vary widely across the science parks assessed as some have a bias to manufacturing/production (Tuas Biomedical Park) and some more laboratory-related (i.e. 91% laboratory space at Adlershof City of Science). However, it is also worth noting the high office content on these science parks .

Figure 7. Average split of type of space on science parks²⁷

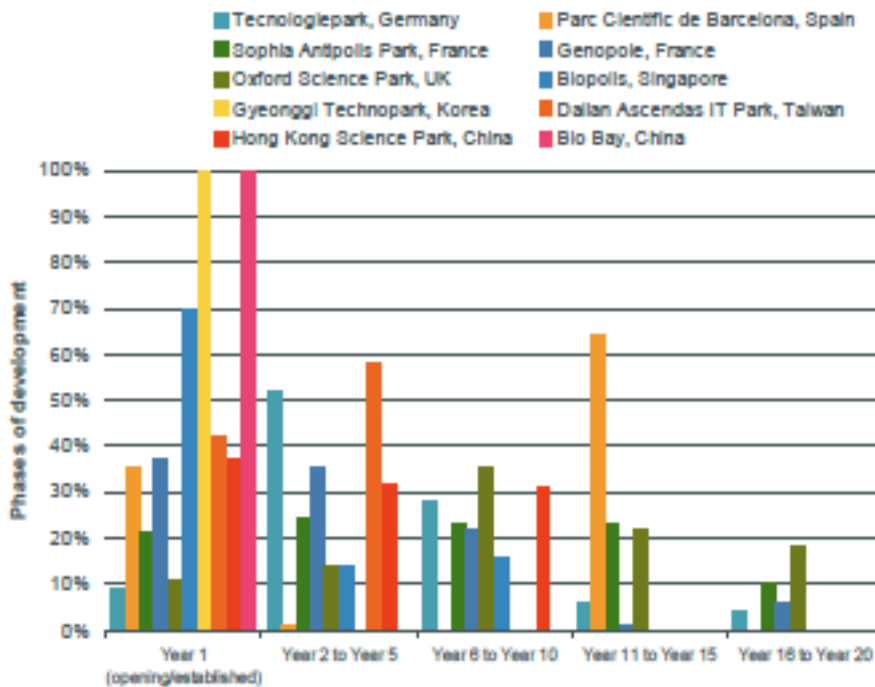


Phasing

Understanding the best practice for phasing is a difficult exercise. The phasing is reliant upon a number of factors through time, including the wider economy and the demand from corporates. Phasing on future schemes will follow a sensible pattern of delivery, but again is influenced by the model of development. A demand-led model would provide a slower phasing, generally, than a model that is driven by governmental intervention. Both models have shown success and the following graphs show the varying patterns of real estate delivery over the life time of a project.

Figure 8 below shows the phases of development. In some cases the first year delivery was 100%. This includes Gyeonggi Technopark, Korea, which was government-led but a relatively small park compared to some other examples used in the benchmarking. In contrast, Oxford Science Park, UK, which is representative of a real estate investment-led approach (demand-led), was much more constrained in its phasing, offering 11% in the first year (opening year). WSBC can be expected to lean more towards this approach.

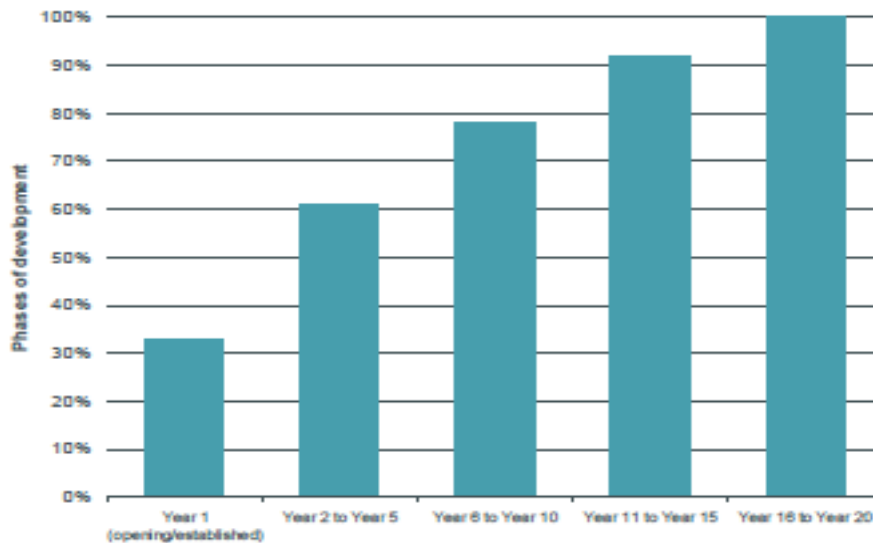
Figure 8. Science park phasing²⁸



Overall, the exercise produced an average phasing for the benchmarked science parks. The results of this are shown in Figure 9. below. The first year, the point at which the park is open and real estate available to occupy, on average 33% of the eventual size of the park is available. The averages have been worked out on an unweighted basis (based on an average of the individual phasing splits for each park).

The chart shows that by the end of the fifth year, 60% of the eventual park size has been developed. There was an average phasing delivery of between 16 to 20 years for those parks included in the benchmarking exercise. However, this was heavily skewed by the older, demand-led models in Europe.

Figure 9. Average science park phasing²⁹



Detailed analysis of the ‘best’ Far East and European science parks

This section reviews two of the science parks benchmarked above. These two examples, in the authors’ view, possess established elements of best practice. Indeed, the two parks are the best examples in the Far East (One North, Biopolis) and Europe (Sophia Antipolis). The rationale for including this section is that it complements the real estate advice in the other sections of the report.

There are lessons to be learnt from Biopolis, but a government-driven scheme is unlikely to be delivered at WSBC. Despite this, its elements of mixed-use and its success in attracting companies from within the life science sector should be an aspiration for WSBC.

One North, Singapore (Biopolis)

The promoter

JTC (formerly Jurong Town Corporation) is Singapore’s leading provider of industrial real estate solutions and services. Since its establishment in 1968, the JTC Corporation has developed 6,600 hectares of industrial land and 4.4 million square metres of ready built facilities. During the process, JTC has accommodated more than 7,000 home grown companies and multinationals. Overall, Singapore has established its position as a leading global site in Asia for high-quality pharmaceutical, biotechnology and medical technology manufacturing. Singapore is a ‘hub’, which is what West Sussex should aspire to for serving Europe. The Economic Development Board (EDB) of Singapore has worked closely with agencies such as the Agency for Science Technology & Research (A*STAR), the Ministry of Health (MOH) and the universities. The effect has been a growing number of leading companies locating in Singapore, including 8 of the top 10 pharmaceutical and all of the top 10 medical technology companies establishing their regional headquarters in Singapore in order to expand their outreach into Asian markets.

Singapore’s GDP per capita has grown rapidly from US\$512 in 1965 to US\$35,640 in 2006. The focus on higher value industries has driven this GDP growth. The government has

plan is for Singapore to be the “biomedical hub of Asia”. Similarly WSBC’s plan must be to be a hub for Europe. Figure 10 illustrates the masterplan for this successful scheme. When finished in 2010, Biopolis will house up to 5,000 researchers from top pharmaceutical firms and government laboratories. In the United States, only the San Diego biomedical cluster will be larger.

One-north comprises five hubs:

- Biopolis – world-class biomedical science research and development (R&D) hub in Asia;
- Fusionopolis – vibrant and exciting place for information communication and media industries;
- Vista Xchange – Vista Xchange is also the transport hub for one-north accommodating high-rise offices, hotel, entertainment centres and high quality residential development;
- Wessex Estate – Colonial-style residential development that will be the creative enclave;
- One-north Park – ‘Relief space’ for one-north’s work, live, play, and learn communities. The whole concept has and will be delivered in three phases:

The last two components, centered around large-scale housing complexes, have been judged to be essential to the success of the project as they have provided key worker accommodation as well as a multi-use environment which is the key to a vibrant development. WSBC, because of its scale and hub aspiration, can be expected to have similar housing requirements if it to maintain enough vibrancy.

Figure 11. Biopolis location map³¹



Biopolis is also located next to Singapore's existing acclaimed science parks that were first developed in 1980 (phase 1), with phase 2 delivered in 1993. The National University of Singapore (NUS) is also in close proximity, accommodating 30,000 students from over 100 countries. This provides a considerable potential supply of labour and attracts international talent.

The attraction of Biopolis is its robust infrastructure that allows research-based organisations to rapidly establish operations with minimal upfront capital outlay. The shared facilities at all levels, from basic glass washing to high-end scientific services, ensures a degree of efficiency for those companies that may otherwise have been unable to afford it at the early stage of their development. WSBC must do the same if it is to succeed.

The phasing

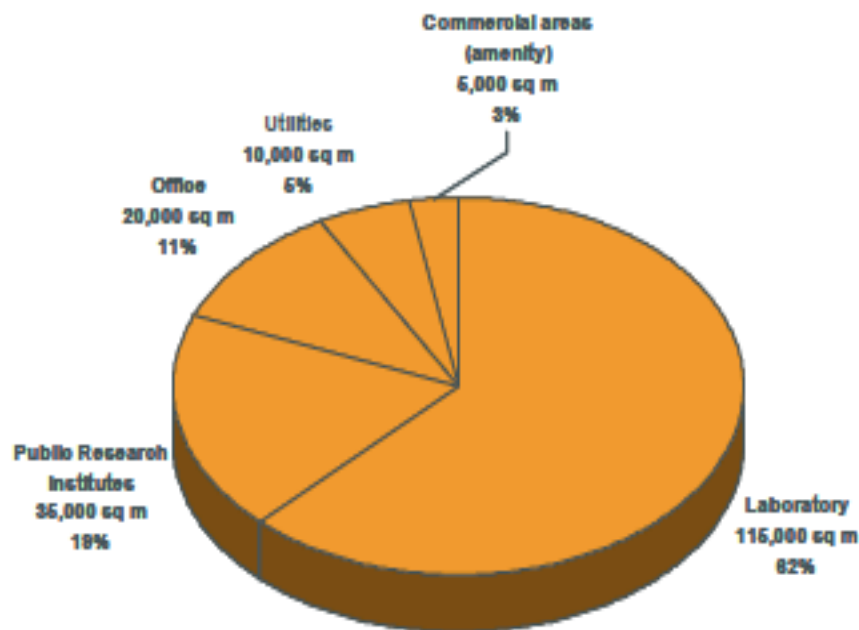
Phase 1 of Biopolis is a cluster of seven buildings that was launched in October 2003 totalling 185,000 sq m (199,130 sq ft). Two of the buildings (Chromos and Helios) are dedicated to biomedical players from the private sector. The other five buildings (Centros, Genome, Matrix, Nanos and Proteos) house the biomedical research institutes of the Agency for Science, Technology and Research (A*STAR), Singapore's lead agency for scientific research and development. A*STAR subsequently launched a national scholarship programme to nurture 1,000 local PhDs in 'high end' universities in the US and UK. To date, A*STAR has awarded more than 800 PhD scholarships in physical sciences, engineering and biomedical sciences.

Phase 2 of Biopolis was launched in 2006, yielding an additional 37,000 sq m (398,260 sq ft) of biomedical R&D space for research institutions and biomedical companies. The multi-tenanted buildings are sited on a 0.8 ha site next to Phase 1. Comprising two buildings (Neuros and Immunos), Phase 2 is almost fully occupied. This phase has focused on building up strong translational and clinical research expertise.

Phase 3 of Biopolis broke ground in April 2008. This multi-tenanted research facility is intended to extend basic research activities into translational, i.e. applicable to the population under study, and clinical research as well as medical technology research. The facility is scheduled for completion in 2010.

The success of Biopolis can be assessed by reviewing the existing characteristics the first phase. Phase 1 is home to more than 2,000 scientists, researchers, technicians and administrators. The research community is fully supported by state-of-the-art infrastructure and services catering for the full spectrum of biomedical R&D activities. The 185,000 sq m (199,130 sq ft) seven-building development is at present more than 95% occupied.

Figure 12. Biopolis floorspace breakdown – Phase 1³²



University & hospital links

Similar to the WSBC proposals, a major hospital in very close proximity is an attraction for the scheme. The National University Hospital (NUH) is a 928-bed teaching hospital. The similarity to the potential scheme at WSBC, the ‘nukids’ service is provided by the Children’s Medical Institute (CMI) at NUH.

CMI also incorporates the department of Paediatrics of the Yong Loo Lin School of Medicine and the National University of Singapore. Singapore’s University Department of Paediatrics was first established in 1962 and moved to the existing site at National University Hospital in 1986. Built on a strong and firm foundation of teaching, research and excellent clinical care, CMI has a long tradition of providing comprehensive care to children from Singapore and the region. CMI also trains doctors and specialists, offering a structured training programme. This model should be an aspiration for WSBC.

The ‘nukids’ service is delivered through modern and child-friendly outpatient and inpatient facilities, including a 24-hour Children’s Emergency facility. The 90-bed inpatient centre houses a neonatal intensive care unit and a paediatric intensive care unit for critically ill newborns and children; the Children’s Blood and Cancer Centre for children with cancers and a children’s kidney centre offering haemodialysis & peritoneal dialysis for children with renal failure.

The measures of success

Singapore is hailed as one of the World’s top innovation centres and Biopolis, specifically, aims to be a world-class biomedical science R&D hub in Asia. This reflects how the Republic has long been committed to creating an environment conducive to innovation. The Boston Consulting Group (BCG) Innovation Index, published in March 2009, named Singapore as

the world's most innovative country. In a survey covering 110 countries, it beat nations which have strong innovation traditions, such as the US (ranked 8th), Japan (ranked 9th), Germany (ranked 19th) and South Korea (ranked 2nd).

To rank the countries, BCG's Innovation Index looks at both "inputs" – government policies supporting education, workforce quality, infrastructure and trade – and "performance" – R&D results, business performance, employment growth and other impacts of innovation. In more detail the innovation inputs include government and fiscal policy, education policy and the general innovation environment. Outputs include patents, technology transfer and other R&D results; business performance, such as labour productivity and total shareholder returns and the impact of innovation on business migration and economic growth. The overall index score represents an average across the two measures.

Singapore's ranking at the top illustrates the commitment by the Singapore government to pharmaceutical, medtech and other high level technology sectors. It also highlights the important role played by the provision of appropriate business space to support businesses, both indigenous and inward investors.

The 2.4 million sq ft (0.2 million sq m) research campus at Biopolis has become the icon of Singapore's success in biomedical sciences. Co-locating global companies' research operations with publicly funded research institutes, Biopolis is imbued with a campus spirit to advance science and human healthcare via cross-disciplinary, public-private collaborations. In recognition of this significant advantage, numerous companies have chosen to set up their Asian R&D operations at Biopolis. They include:

Abbott;
GlaxoSmithKline;
Lilly;
Novartis;
Schering-Plough;
Takeda;
PharmaLogicals (emerging biotech).

In September 2009, Waseda University of Japan opened its first overseas research institute - Waseda Bioscience Research Institute in Singapore at Biopolis. The importance of institutes locating at Biopolis should not be understated. The background support for the success of Biopolis, and Singapore more generally, is the strict adherence to international standards and ethical guidelines. Consequently, Singapore is home to global clinical research organisation (CROs) and the clinical development units of major pharmaceutical companies. Examples include:

Covance – clinical trial management, central lab services;

ICON – clinical trial management, central lab services, data management;

Gleneagles CRC – clinical trial management, site management, biometrics, bioequivalence (brand v generic);

MDS Pharma services – clinical trial management, data management;

Quintiles – central lab services, clinical trial management and supplies, regional training.

With regards to the fiscal incentives, the Singapore Economic Development Board (EDB) describes Singapore's tax structure as 'pro-enterprise'. It offers financial incentives to pharmaceutical companies wanting to carry out their research or manufacturing in Singapore. In manufacturing, where companies are establishing profit centres, there is the pioneer incentive that awards full corporation tax exemption on qualifying profits for a set period of up to 15 years.

EDB also provides research grants to companies of 30-50 per cent of R&D expenditure over a five year period. There are also tax incentives to encourage companies to channel more funds into R&D work in Singapore.

As Singapore continues to advance economically, it has emerged as more than a converging point for business. In a survey reported in The Economist in March 2002, Singapore's quality of life surpassed that of London or New York. Thirty-nine factors were considered, including political stability, personal freedom, air pollution and the quality of healthcare, schools, restaurants and theatres.

Being recognised as one of the most competitive economies in the world, more than 10,000 trading companies use Singapore as their distribution point for markets in the Asia-Pacific. In addition, more than 5,000 foreign companies (including many of the Global 500) also use Singapore as their Asia Pacific Base. Among the accolades that Singapore won recently, these include:

Top Business Environment in Asia Pacific (EIU Country Forecast – May 2002);

Top in Networked Readiness (WEF Global Competitiveness Report 2001-2002);

Top in Quality of Life in Asia (IMD World Competitiveness Yearbook 2002);

The 2nd in Intellectual Property Protection in Asia-Pacific (WEF Global Competitiveness Report 2001-2002);

The 2nd most profitable place for investors (BERI Report 2001-III);

The 2nd freest economy (Economic Freedom of the World: 2002 Annual Report);

4th in Growth Competitiveness (WEF Global Competitiveness Report 2001-2002);

5th in World Competitiveness (IMD World Competitiveness Yearbook 2002)

The 5th least corrupt nation (Corruption Perceptions Index 2002);

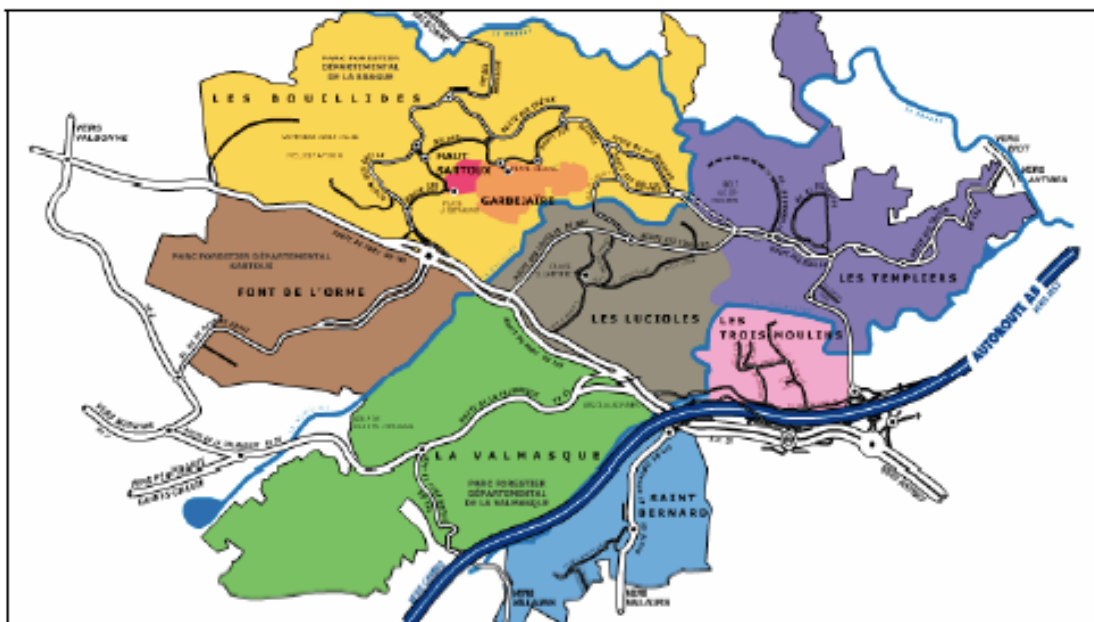
It can therefore be concluded that if WSBC is to compete, it too must focus on excellence.

Sophia Antipolis, France

The promoter

Sophia Antipolis is one of France's oldest and largest technology parks covering an area of approximately 2,400 hectares, close to a quarter of the size of Paris. Rather than being a pure 'technology' park dedicated to commercial uses a mix of uses have been developed on the site including residential, amenities, and education. The park was and still is a public sector initiative led by national and local government with the General Council being the principal supporter particularly in terms of providing development funding for the higher education and national research centres located on the park. The vision for Sophia Antipolis was to create a 'city of learning, science and technology' in the Provence-Alpes-Maritimes-Côte d'Azur region with the aim of assisting the region in creating a more balanced income distribution incorporating high-tech industries and supported by higher education facilities and research, rather than relying on traditional sectors of tourism and real estate.

Figure 13. Sophia Antipolis Development Zones³³



The site for the

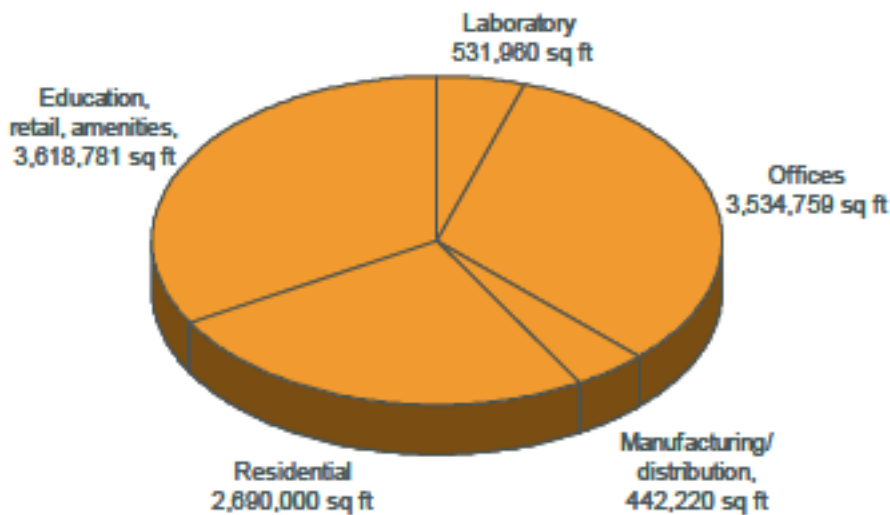
park was first identified in the mid 1960's but it was not until 1972 that the development company, SYMIVAL, was established to bring the site forward. The key element of the development of Sophia was the establishment of higher education on the park. The University of Nice was officially created in 1965 later changing its name to Nice Sophia Antipolis in 1989, with a number of faculties locating on the park, such as the Institute of Molecular and Cellular Pharmacology. The Government's commitment to the development of Sophia was further reinforced by the National Centre for Scientific Research Laboratories developing premises on the park in 1976.

Overview of the scheme

Sophia Antipolis is made up of 9 districts, with the Route Du Parc (Road 103) being the central route through the park. The bulk of development has focused in the Les Bouillides and Les Lucioles areas in the north and centre of the park where the majority of the higher education facilities are located as are the bulk of residential units including student housing.

Sophia Antipolis' built stock totals approximately 10.8m sq ft (1.01million sq m). Of this, 42% is commercial stock largely made up of offices, with just over 500,000 sq ft made up of laboratories with a further 442,220 sq ft designated as manufacturing/ distribution space. Residential provision on the park totals approximately 2,200 units, some of which is student housing, equating to 2.69m sq ft (249,909 sq m).

Figure 14. Sophia Antipolis: Floorspace breakdown³⁴



There is an additional 7.5 million sq ft (approx 700,000 sq m) of land allocated for further development. Some of this is future space and is currently in the development pipeline with an estimated delivery date of 2012. This includes the 592,015 sq ft (55,000 sq m) to be delivered as part of the ICT centre, 64% of which will be commercial office space with the remainder made up of education facilities as part of the ICT centre. A new neighbourhood area of 462,848 sq ft (43,000 sq m) is also envisaged to be delivered in 2012 (St Philippe), just over 50% will be assigned to higher education uses and the remainder made up of residential and local amenity/neighbourhood uses.

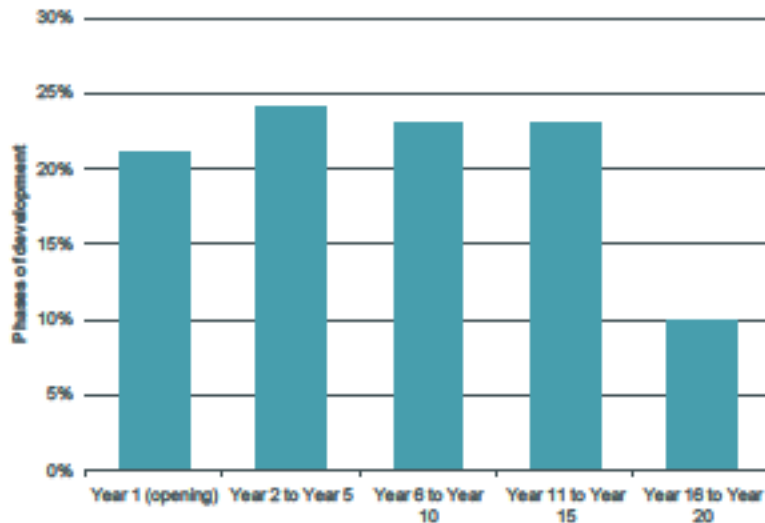
There is an environmental restriction applied to the development of Sophia in that two thirds of the total area has to remain as green space. As a result the build density is relatively low at 1,800 sq ft per acre (413 sq m per hectare) when compared to other, more urban, developments. Part of the reasoning behind the large provision of green space, apart from environmental concerns, is that it is thought to enhance the attractiveness of the park to occupiers and their employees with knock-on benefits including enhanced productivity.

The phasing

Following the site being identified in 1972, the development was kick started by a number of land sales to a number of public sector occupiers such as FRANLAB, a subsidiary of the French Oil Institute and the National Centre for Scientific Research, with the first occupiers on site appearing in 1974; this is equivalent to the anchor tenant concept proposed for WSBC. The late 70's saw a number of education facilities built out with CERAM (now part of SKEMA Business School) locating on the park in 1978. The first leasehold premises were not developed on the park until 1981, almost 10 years after the site was first allocated.

Over a 20 year period, delivery of built stock has been relatively constant. Based on 5 year development blocks between year 1 and year 15, phasing has ranged from 21% to 24% of total stock. The final delivery block (year 16 to 20) accounted for the smallest proportion of total delivery (10%). This drop off in delivery is typical of most parks as they mature.

Fig 15 Sophia Antipolis phasing ³⁵



The development of Sophia Antipolis has been driven by the higher education establishments found on the park, with their early presence considered to be the trigger for its commercial development as they facilitated access to a skilled labour force and research partners, which have been key in attracting occupiers to the park. In contrast to other technology/science parks, incubators appeared further down the development pipeline.

The higher, further education and training establishments located at Sophia cater for over 3,000 students and include Université de Nice Sophia Antipolis (UNSA), Ecole Nationale Supérieure des Mines de Paris, Ecole Supérieure en Sciences Informatiques, ESINSA, Eurecom Institute, INRIA, Theseus Institute and CERAM Business School. There is a particular emphasis on applied maths, information technology, telecommunications, automation, economics and management which is represented in the sectoral breakdown of commercial occupiers on the park. These establishments account for approximately 2.9 million sq ft (266,898 sq m) of space on the park, 27% of total built space. Of this, 631,163 sq ft (58,637 sq m) is dedicated to research functions.

The measure of success

The success of Sophia can be measured in part by its ability to attract large, multinational business occupiers and in turn employees. There are over 1,200 businesses employing over 27,000 people located in Sophia. Employee retention at the park has been cited as being high, largely attributed to the environment of the park and provision of amenities. Multinational firms or those backed by foreign capital, represent 12% of all firms equating to approximately a quarter of all jobs. The presence of multinationals is also represented in the origins of those employed on the park as one out of four jobs is held by a non-French person.

The scale and location of Sophia has also allowed firms to establish their manufacturing and distribution facilities on the park, as well as their office functions. The ability to have all three functions in the same place has also been key in attracting occupiers as has the opportunity for expansion as a number of development plots remain.

The Information Technology sector is the largest employer accounting for 43% of all jobs, followed by the service sector with 30% of total jobs. The dominance of the Information Technology sector has been driven, in part, by Sophia's position in the "Telecom Valley" that stretches from Milan to Valencia along the Mediterranean coast. In this instance, the presence of education and research capabilities at Sophia has been key in attracting occupiers from this sector and establishing Sophia Antipolis as an Information Technology 'hub'.

The development of Sophia as a 'hub' location has also been facilitated by the number of industry clubs, associations and events that have been established on the park. For example, there is the Club Sophia Juris for legal practitioners and the Club Sophia Biotech aimed on those working in the Life Sciences/ Biotechnology sector, amongst others. These have been particularly important in attracting small, innovative firms who value the networking benefits of these types of clubs/associations.

The relatively large numbers employed in higher education is accounted for by the strong presence of higher education facilities on the park. Health Sciences and Chemistry occupiers account for 9% of jobs. Companies in this sector are particularly involved in R&D programmes in relation to immunology, genetics, dermatology, pharmacy, biochemistry and medical imaging, as well as medical technologies. Manufacturing and distribution functions are key activities on the park for companies in this sector.

Table 9. Sophia Antipolis: Job and company sectoral breakdown ³⁶

	Jobs	Firms
Information Technology	11,749	317
Service sector	8,197	621
Higher Education facilities and Research Training	3,279	69
Health Sciences & chemistry	2,459	55
Other (retail, neighbourhood services etc)	1,639	317
Total	27,323	1,379

Key occupiers at Sophia Antipolis include;

- Amadeus Technology Solutions (Transaction processor for the global travel and tourism industry): Product Marketing and Development HQ on the park employing over 1,200 people.
- Thales Group (electronic systems company): employing over 800 people as part of their Underwater Systems operations.
- Accenture (global management consulting, technology services and outsourcing company): have their R&D centre specialising in Intelligent Device Integration, Analytics and Business Intelligence, Human-Computer Interaction and Systems Integration, located at Sophia employing 350 people.
- Galderma (pharmaceutical company focused on dermatology): R&D centre based in Sophia employing 360 people.
- Laboratories Genevrier (biotechnology firm specialising in Rheumatology, Dermatology and Gynaecology): employing 215 people
- Allergan (specialising in pharmaceuticals, biologics and medical devices): employing 210 people

Part of Sophia Antipolis' success at attracting multinational occupiers for R&D purposes has also been driven in part by the tax incentives offered at a national level. The CIR, which is a research tax credit, is available to all industrial, commercial and agricultural businesses engaging in R&D. Businesses with an annual R&D expenditure under 100m Euros receive a 50% tax credit in the first year, 40% in the second year, 30% for the remainder of the scheme. For those with an annual R&D expenditure over 100m Euro's they receive a 5% tax credit for the scheme period. There is an additional 60% flat tax credit on all R&D expenditure made in partnership with a federal laboratory.

The fact that Sophia Antipolis was established from a Greenfield site with no pre-existing university and/or business links is the true measure of its success considering that it is now home to more than 1,200 businesses. However, while Sophia has a strong reputation within France its profile outside the country is relatively limited and may prove an obstacle when attracting future international occupiers.

Sophia can be considered as a forced knowledge cluster and technology park as prior to its development there was no existing local or regional demand. The support from national government and its commitment, demonstrated by the relocation of a number of Government institutional facilities to the park, plus the establishment of higher education facilities on the park have been key driving factors behind the development of Sophia Antipolis. These factors were further enhanced by the location advantages of the park, particularly in terms of its proximity to a major international airport. The vision to create the park as a mixed use location with residential and local amenity provision in an attractive environment also assisted in enhancing the park's image as an attractive business location. It is clear from the above that WSBC shares many of these advantages – connectivity, local knowledge clusters – however it is also clear that government support is going to be essential for WSBC to succeed. Sophia could not have succeeded without deep government support. At the same time, the already existing educational clusters around WSBC is a major advantage which Sophia did not have.

Case Studies of Medi Parks

The science park can have various associations, including research institutes, universities and hospitals. Of particular relevance to WSBC is the presence of a hospital. Therefore, this section highlights examples of best practice around the World where there is an adjacent hospital to the science park and/or have strong hospital relationships – referred to in some cases as ‘medi parks’. The examples show that the potential commercial real estate floorspace can be substantial next to a major hospital. This list is not exhaustive, but gives an idea of best practice, both existing and planned. The source of the information is the website for each location.

In general, the US leads the way in this type of development, but there are still new examples from outside the US.



The University of California in San Francisco (UCSF) plan to build a 289-bed, integrated hospital complex to serve children, women and cancer patients near its existing, 43-acre biomedical campus at Mission Bay. Upon completion of the first phase in 2014, the 878,000 sq ft (81,566 sq m) hospital complex will include a 183-bed children’s hospital with urgent, emergency and paediatric primary care and specialty outpatient facilities.

UNIVERSITY OF MIAMI
LIFE SCIENCE PARK



The University of Miami (UM) is one of the leading private institutions in the US with a strong history of academic achievement. The University academic community includes over 10,400 undergraduate students, 4,900 graduates students and over 3,000 faculty members. UM has enjoyed a steady upward trajectory in prominence, reflected by the increasing number of renowned researchers from around the country who have chosen to relocate to UM. The result has been one of the highest growth rates in sponsored research funding in the nation and the unprecedented creation of high-value intellectual capital.

The UM Life Science Park will be near to six outstanding hospitals including the Holtz Children’s Hospital (254 beds), home to one of the largest neonatal intensive care units in the country. UM Life Science Park will provide facilities, infrastructure and interdisciplinary opportunities to foster the development of life sciences, technology and biotechnology innovations. With close proximity to the Leonard M. Miller School of Medicine, the Miami Health District and centrally situated in the heart of Miami, the UM Life Science Park will facilitate access to outstanding resources and create synergies between the University and tenant companies, advancing clinical breakthroughs and benefiting all people.

The development of a world-class research park supports the University’s discovery mission. Under the proposed Master Plan, the University may develop up to 1.8 million

square feet of laboratory, office and retail space on 10 acres. The plan contemplates a full build-out of five research and development buildings dedicated to life sciences research. The UM Life Science Park may be the most exciting and possibly the most important advancement in UM's history as it relates to innovation and advancement in the life sciences.



The East River Science Park (ERSP) in New York, in conjunction with the Alexandria Centre for Science and Technology, is a collaboration between the New York City Economic Development Corporation and Alexandria Real Estate Equities. It is poised to become one of the world's leading centres for life science and technology commercialisation. Capitalising upon its proximity to New York's top academic/medical institutions and major hospitals, the scheme will provide 1.1 million sq ft (0.1 million sq m) campus of office/laboratory space designed to foster cross-institutional collaboration by including networking environments, innovative laboratories and premier office spaces. Construction of Phase I began in early 2007 and completed at the end of last year. Totalling 3.5 acres in size, ERSP has been zoned for bioscience use and will initially provide 725,000 sq ft (67,353 sq m) of scientific research and development space, with related office and retail. The second phase on an adjacent parcel will provide an additional 442,000 sq ft (41,061 sq m). The ERSP provides real estate options for a range of bioscience companies: pharmaceutical, biotechnology, bioinformatics, medical device, contract research companies as well as law or VC firms that specialize in the life sciences.



The Edinburgh BioQuarter is a landmark life science real estate development which will establish Edinburgh and Scotland as one of the world's top ten centres for biomedical commercialisation. Located alongside the new Royal Infirmary of Edinburgh, BioQuarter is a major public and private sector collaboration across a large adjacent greenfield site. Unique to the UK, Edinburgh BioQuarter is the only location to offer a large state-of-the-art teaching hospital, the University of Edinburgh's world-renowned medical school and bespoke biomedical research and development facilities all on one site. The existing BioQuarter site is home to a community of over 1,200 dedicated researchers. The newly opened 100-acre site at BioQuarter will ultimately provide more than 500,000 sq ft (46,450 sq m) of further academic research space and an additional 900,000 sq ft (83,610 sq

m) of accommodation for commercial research-based companies. At a glance:

- \$1.2 billion public/private investment project;
- 1.4 million square feet of flexible development;
- A 100-acre biomedical research park;
- A magnet for the best scientists, clinicians and researchers;
- The largest grouping of stem-cell researchers in the UK;
- Building on existing renowned expertise at the University of Edinburgh in the field of regenerative medicine;
- Purpose-built facility at the Centre for Biomedical Research site that will also include GMP-grade (Good Manufacturing Practice) facility for development of HSC (Haematopoietic Stem Cell) lines;
- On-site business development team that can act as gateway to research expertise.

BioQuarter includes:

- The Royal Infirmary of Edinburgh, a new 900-bed state-of-the-art teaching hospital. The University of Edinburgh Queen's Medical Research Institute (QMRI) and adjoining Medical School research and teaching facilities. The QMRI provides facilities for interdisciplinary research in reproductive biology, cardiovascular science and inflammation research;
- The Scottish Centre for Regenerative Medicine (SCRM). Announced in January 2007, the SCRM will be the next flagship science institution at BioQuarter;
- The Institute for Stem Cell Research (ISCR) – The ISCR is a world-leading centre for multidisciplinary research in mammalian stem-cell biology;
- The Roslin Institute – One of the world's leading centres for studies relating to animal genetics and development;
- The Moredun Research Institute – Internationally recognised for its work on infectious diseases of sheep and other ruminants.



Hsinchu Biomedical Park in Taiwan is also covered partially with a review of the Hsinchu Science Park within the benchmarking section above. However, considering the presence of a hospital it was worth highlighting it as part of this section.

Hsinchu Biomedical Park, is a proposed biomedical park in northern Taiwan's Hsinchu County. As part of the master plan there will be integrated community facilities, residential, retail, office, hotel, and conference facilities which will occupy space adjacent to Taiwan's new high-speed rail line. The initial plan for the 38hectare (94-acre) plot is for a medical centre, which will include a cancer centre, a proton centre, and a general hospital, as well as an 18-hectare (45-acre) plot for biotech industry facilities.

The Hsinchu county government gave initial approval in 2009 to an application by the Department of Health (DOH) to establish a 500-bed hospital on the park to be known as the National Hsinchu Hospital. It is envisaged that the hospital will become operational in 2015. At this point it is believed that the DOH will apply to add a further 200 specialized beds, including 20 intensive care beds, four burn care beds, 36 infant intensive care beds, 15 infant beds, 28 emergency observation beds, 20 dialysis beds, 10 respiratory care beds, 22 operation recovery beds and 15 miscellaneous beds.

In addition to the hospital, a medical centre for clinical research is also planned and has been categorized as a national-level medical centre that will not be affiliated with any medical universities. It is being planned by the central government, pooling the medical resources of various local governments.

Section IV - Conclusions

- Access to a skilled workforce is the primary reason why tenants locate in a science park.
- WSBC scores well in comparison to other leading science parks in the world for transportation and connectivity. When the benchmarking is assessed on a wider set of variables, WSBC still scores well.
- A demand-led science park requires longer phasing than a science park driven by government intervention.
- Two of the largest and most successful parks in the world (Biopolis in Singapore & Sophia Antipolis in France) have many attributes envisaged for WSBC – long-term government support, strong links with universities and/or hospitals located on or adjacent to the site, mixed-use real estate to include laboratories, commercial and residential space.
- US is the leading location for the development of “medi-parks’ – science parks adjacent to major hospital. Various examples demonstrate that potential commercial real estate floorspace can be substantial next to a major hospital.

SECTION V

IMPLEMENTATION

West Sussex Bio City - outline timescale

- Further market studies will provide evidence of market demand, but the unique nature of the Bio City offer with access to a world class tertiary healthcare cluster ensures strong initial uptake of science park space.
- Even so, the 150-acre Phase 1 scenario has now been modelled over 7 years from delivery of the first science park space. The hospital and first science park space should be delivered by 2015, planning approvals allowing.
- There is an option of Phase 2 at Chennell's Brook of an additional 120 acre site adjacent to the Phase 1 site, on the western side, that could be developed at a later stage. Current proposals allow for an extra 100,000m² of built commercial /R&D space, and 600 more dwellings, thus bringing the total up to 3000 dwellings. This mix would be subject to review of ongoing market demand, and further approval from local authorities.

Role and financial incentive of Bio City Development Co

- The structure will be based on the traditional science park model, whereby BCDco charges a fee for the development of the project, as well as holding a significant equity stake, which will be subsequently remunerated.

Current status of UK Science Park space

- Current vacancies are caused by the wrong kind of space being built at the wrong time. Science park spaces are as specialised as are hospital beds:
- Building the wrong kind of space can reduce occupancy levels to under 20% as has been seen in other parks in the UK (Dundee, London etc.)
- Hence the appetite for new science parks by large pharma and medtech companies (GSK, Novartis, GE Healthcare)

Anchor tenant

- An anchor tenant is one of the secrets to success of a major science park; precedents include Novartis in Singapore, Glaxo at RTP and GSK all over the world.
- The anchor tenant can be a major pharma, medtech, or university hospital.
- BCDco has already undertaken discussions with three of the top ten pharmaceutical and medtech companies about participating in WSBC and the feedback has been very positive given the surrounding labour force.
- The clearest sign of the level of market demand is to look at what these top ten pharma companies are already doing.
- Within this group, we find that seven of the ten have been involved in the anchoring of new science parks, built to detailed specifications, over the past five years.

Sources of Venture Capital funding for WSBC-based companies

- Venture Capital ('VC') is a global industry with the majority of funds investing in both Europe and the US.
- WSBC-based companies can therefore expect in principle to lie within the major target geography for global funds.
- The developers will however need to undertake a significant marketing campaign during the first two years of the project to ensure that the industry makes regular visits to the campus and understands the Bio City to be a regular and dependable source of innovative companies. Without this reputation advantage, the project will not in turn attract new companies to its gates.
- Key VC funds which can be expected to actively support WSBC-based companies include: HBM Partners, 3i, GLSV, GE, NV and others.
- Within the first three years, WSBC should also seek to seed its own proprietary fund, which will serve as a lure for the most innovative companies. There is strong precedent for this model in both developed and emerging markets (Biopolis, RTP, QSTP).

Challenges to developing successful science parks and/or public access healthcare facilities in UK

Key Positive driver

- Life Sciences is one key industry sector with substantial growth still forecast. UK is 2nd only to the US in the global market, and currently maintains a competitive advantage over many locations.

Development Issues

- The infrastructure to produce a quality science park environment can overburden the real estate value.
- Scientific/medical sector construction costs are increasing, but revenues are lower as occupiers do not tend to spend on real estate as a priority. There are many occupiers in science parks, but not many are actually growing and investing in real estate
- A single major occupier in a science park will subsidise many other smaller other occupiers, which is the opposite from retail developments. Thus the anchor tenant will be key.
- Start-up biotechs/research teams invariably choose to remain in their garden sheds or inferior university space (n.b Universities will fight to keep this income) for some time before they will pay market rents for state-of-the-art premises.

Leadership

- Contrast the failure of Paddington Green Science Park in London where no-one would take a visible lead on the project on a national level, against Cambridge Medical Park with dynamic, high profile leadership from Dr. Mary Archer, and the Wellcome Trust Scheme on Euston Rd in London.

UK Health Economy

- The UK health economy is currently challenged. PCTs struggle to afford running new PFI hospitals, so the new hospitals are looking at how to capture the market. As a result, weak PCTs are losing out. They tend to prefer a network of smaller cottage hospitals.
- NHS is making efforts to commercialise, increasingly so in the current economic climate. Some NHS Trusts are particularly dynamic in this direction.
- There is still a marked absence of the private sector within the publically accessed acute hospital sector.

Current UK science park market

- There is oversupply, but success is possible.
- Take-up rates are slow. It's not easy to introduce a new venture into this market.
- Identifiable science park models include:
 - University Science Park.
In their rush to commercialise, this supply has been spread too thin. They have suffered from a tendency to the 'If you build it, they will come' model, and have thus often failed.
 - Big Pharma Science Parks.
These have not brought the quality R&D to the research parks that occurs in university environments; eg Pfizer Research facility in Sandwich, Kent – there are now questions what to do with it. Can the new GSK/Wellcome Park just launched in Stevenage get over this?
 - Foundation Trust Hospitals.
Several Trusts are trying to protect their core asset by building a supporting business around it.

Summary: Key factors for a successful development

- Dedicated and effective leadership.
- Political support.

GlaxoSmithKline backs £170m science park project that would create up to 3,000 jobs³⁷

GlaxoSmithKline is joining with the Government and the Wellcome Trust to develop a science park aimed at reinvigorating the UK's biotechnology industry and creating up to 3,000 jobs. Companies have been badly affected by the recession as the finances of venture capitalists collapsed and they have struggled to fund projects. The new site will be based in Stevenage, cost £170m to develop and potentially host 25 companies. Andrew Witty, the chief executive of GSK, said it would "affirm the UK as a global hub for the life-sciences industry". Biotechnology companies have been badly affected by the recession as the finances of venture capitalists collapsed and they have struggled to fund projects.

Nonetheless, the UK remains second only to the US as a centre for the industry and the campus will offer a model of "open-innovation" – by encouraging co-operation with equipment and skills – which aims to rival US facilities in San Diego and Boston. The scheme, the first phase of which should open in 2011, will offer a base for roughly 1,500 scientists as well as the same number of support staff. Lord Mandelson, the Business Secretary, said: "The Stevenage campus represents a huge investment in the future of Britain's bioscience industry and is a strong new platform for the work of our Office for Life Sciences. "Ultimately it will help us build towards a stronger UK economy coming out of the global downturn.

However, although the biotechnology industry welcomed the project, Clive Dix, the chairman of the BioIndustry Association said "What is needed at the current time is investment in companies and not in infrastructure." Of the initial funding of £37.6m, £11.7m will come from the Government's 750m Strategic Investment Fund, unveiled in the Budget, with another £5m from the Technology Strategy Board. The Wellcome Trust will provide £6m, the East of England Development Agency £4m, and GSK will contribute land, facilities and investment worth £10.9m. The 650,000 sq ft facility will be based at GSK's research and development site at Stevenage and will provide the UK's largest drug company with first-hand evidence of business projects in the biotechnology sector, which GSK could then choose to acquire as it seeks to broaden its drug portfolio. Patrick Vallance, the head of drug discovery at GSK, said: "We (GSK) will work best where there is a vibrant biotech sector. " He suggested the scheme would be deemed a success when academics from leading universities are attracted to the 'buzzing, interactive environment' on a regular basis.

Sussex as an attractive location for a Medical Research Park

- Outside of London, the 1st choice is the Oxford-Cambridge arc (hence GSK Stevenage). Thereafter well served locations in S.E. England and other major centres – eg Manchester.
- Sussex is well perceived as a generally affluent area, with above average health spend.
- There has been a lot of interest, and some public funding along the the Sussex coast (Brighton-Bognor Regis) and around the University of Sussex & University of Brighton Joint Medical School.
- Gatwick Green. Extensive studies were made into the possibility of developing it as a Science Park. However, the conclusion was not favourable as they could not gain direct sponsorship from a University. Given the lack of commercial premium for UK Science Park returns, it is being developed as more of a business park location, which may be more suitable for its location and commercially viable for its private developers.
- A Medical Research Park centred on an acute hospital would proved the academic focus, and could well work in the area.

The viability of the Bio City model in Sussex

- BCDCo are being innovative in bringing healthcare to real estate. This makes a difference. However there is a challenge for this to be understood positively by those in the healthcare world to whom real estate is an anathema. But there are plenty of other stakeholders who readily accept the role of real estate.
- BCDCo are operating the acute hospitals as well as acting as master developers. This confirms the fact that BCDCo are rooted in the healthcare world, and are not merely property developers dabbling in healthcare.
- The authors of this report are of the firm opinion that given the factors outlined in sections I & III as important to the success of a Bio City, that the required ingredients as identified throughout this report, are present with sufficient strength to enable West Sussex Bio City to be viable, subject to favourable commercial terms being negotiated.

Current strategy in the private UK healthcare sector

- The following groups develop and operate hospitals and are looking to expand into the UK market:
 - Circle.
 - Aspen
 - HCA
 - Ramsay (operator only).

- Some of the existing major players, such as Nuffield & BMI have different ambitions, and are burdened by their existing real estate portfolios

Additional Issues to the Study

Management of WSBC hospital.

It remains an open question as to who will manage the WSBC hospital, and could be subject to competitive tender to public & private sector providers alike.

Relationship with existing Innovation and Incubation Centre based at Sussex University.

Interviews with Colin Monk suggest that the Universities would welcome the development of a satellite campus Innovation & Incubation Centre. There are many examples of this dual campus model around the world including Harvard and MIT.

The universities see satellite campuses as a way of circumventing quotas on student numbers. The creation of such a centre would create jobs of a higher calibre than is currently the norm in the area.

The desirability of academics/researchers on site.

The presence of academics & researchers on site is highly desirable. This underscores the requirement for the creation of a high quality residential community, exploiting the quality of life offered by the area.

Views of the Universities about participation in the project and the funding issues associated with their involvement .

Based on the interviews that conducted the universities are enthusiastic, although the medical schools themselves are more conservative. Clearly, they see the opportunity to participate in the project as a source of additional revenues.

Section V – Conclusions

- The hospital and first science park space WSBC developed on 150 acres could be open by 2015, with the full development planned for completion over the seven following years.
- WSBC needs to win the support of established Venture Capital funds as well as establish its own proprietary fund to serve as a lure the most innovative companies. This in turn attracts additional blue chip tenants beyond the original anchor.
- Dedicated and effective leadership, along with committed political support are key factors for a successful development.

Study Section Research Status: Interviews

Completed Interviews:

- Savills
- Blackstone
- Atkins
- Bovis LendLease
- GE Healthcare
- DTZ
- Colliers
- Davis Langdon

Key Interview Questions:

- What would be your view of your role in the implementation of a new biomedical city type project in the South East region?
- What do you believe would be the main challenges?
- Do you have experience in the region?
- With which model assumptions can you help us?

Interviewer Pitch:

BCDco, in cooperation with the local authorities, is assembling a study of existing healthcare and biomedical research space supply in the South-East of England. Key backers of the study include Horsham District Council, Crawley Borough Council, West Sussex County Council. As a part of the Study, the authors are seeking to understand existing stakeholder views of local supply and demand in order to ensure that any new developments in the region do not in any way duplicate supply. The study will be used to recommend to regional authorities whether development programs should be initiated in the area. BCDco would appreciate your anonymous contribution to this effort so as to create the most effective supply recommendation. References from local backers of the Study are available on request.

Section VI – Project Financial Model - Conclusions

Note: Section VI is based on a detailed Financial Model developed by BCDco. This contains sensitive commercial information, and is not available to the public. The details are contained within Annex 1, which remains confidential to the report partners. The key conclusions from the Section are summarized as follows:

- A detailed financial model was run on three sample locations identified in Section III, each identifying different characteristics. These were:
 - o Pease Pottage. A split site, with part of the land owned by Crawley Borough Council
 - o North Horsham (Chennell’s Brook). Greenfield site, with space available for ancilliary commercial or key worker accommodation.
 - o GSK site, Manor Royal. A brownfield site, with limited space for science park and enabling real estate development.

- Of the three, North Horsham was the most feasible, showing a marginal positive Internal Rate of Return to investors, with more accessible capital requirements over the first five years of the project, than both of the other scenarios.

- The detailed Financial Model analysed the separate healthcare services (A&E, Acute care hospital, Step Down Facility) and business streams – eg R&D and Commercial space to let, and/or sell.

- Key Worker Accommodation increased the capital funding requirements considerably. Thus, given the co-operation with the adjacent planned new residential development at Chennell’s Brook which could provide these requirements, BCDco do not propose at this stage to include Key Worker Accommodation, but need to reserve the right to be able to do so to meet the project requirements if necessary; the changing economic environment could necessitate a shift in this regard within 12 months.

- Possible key implementation partners – eg architects, project managers, hospital management companies, major vendors etc – have been identified and interviewed who have the quality and experience to provide value to WSBC.

Next Steps

- Official sign-off for this Phase I of work by all parties.
- Agree Phase II budget and funding sources.

Project Phase II (time: 6 months):

- Final selection of project site.
- Commence and complete negotiation with site owners.
- Complete detailed project business plan and expanded feasibility study including detailed legal analysis, market studies, staffing plan.
- Complete detailed marketing materials including preliminary conceptual designs.
- Engage consultants for official valuations and other third party studies.
- Signature of MoUs for 1 to 2 anchor tenants, founding academic linkages and hospital management.
- Recruit anchor equity investors (in addition to BCDco) as well as debt providers.
- Negotiate and sign equity and debt term sheets.
- Negotiate and sign equity and debt final documentation.

Foonotes - Attributions

- ¹ IMF, 2009
- ² Tufts University, Pharma Research Dept
- ³ Tufts University, Pharma Research Dept
- ⁴ SHA Websites
- ⁵ dh.gov.uk /PCT Websites
- ⁶ www.drfoosterhealth.co.uk
- ⁷ www.drfoosterhealth.co.uk
- ⁸ dh.gov.uk
- ⁹ www.drfoosterhealth.co.uk / Company websites
- ¹⁰ www.westsussex.gov.uk
- ¹¹ www.westsussex.gov.uk
- ¹² North East Review Report, West Sussex Primary Care Trust, January 2009
Fit for the Future, West Sussex Primary Care Trust, June 2007
- ¹³ The South East Plan, South East England Regional Assembly, 2007
- ¹⁴ The South East Plan, South East England Regional Assembly, 2007
- ¹⁵ www.westsussex.gov.uk; Crawley Borough Council Local Development Framework Core Strategy, 2008; Horsham District Council Local Development Framework Core Strategy, 2007;
- ¹⁶ Crawley Borough Council Local Development Framework Core Strategy, 2008
- ¹⁷ West of Bewbush Joint Area Action Plan (2009), Horsham District Council & Crawley Borough Council
- ¹⁸ The Core Strategy (2007), Horsham District Local Development Framework
- ¹⁹ West of Bewbush Joint Area Action Plan (2009), Horsham District Council & Crawley Borough Council
- ²⁰ InvestBritainn
- ²² www.standardandpoors.com; www.ambest.com
- ²³ Association of University Research Parks (2007)
- ²⁴ Savills
- ²⁵ Savills/BCDco
- ²⁶ Savills/BCDco
- ²⁷ Savills
- ²⁸ Savills
- ²⁹ Savills
- ³⁰ JTC Corporation
- ³¹ JTC Corporation
- ³² JTC Corporation
- ³³ Sophia Antiopolis
- ³⁴ Sophia Antiopolis
- ³⁵ Savills
- ³⁶ Sophia Antiopolis
- ³⁷ Daily Telegraph, 13th October 2009, Graham Ruddick.