The Oxford Metro
Connectivity for a smarter city

Dr. Nicholas Falk

www.urbedtrust.com

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The URBED Trust

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FOREWORD
The Oxford Metro: connectivity for a smarter city

We recommend this report as a further contribution to the preparation of the Oxfordshire 2050 Plan. The report takes forward the Oxford Civic Society and URBED 2014 report Oxford Futures: achieving smarter growth in Central Oxfordshire and subsequent URBED Trust reports.

The report proposes an integrated transport system called the Oxford Metro that could reduce dependence on the private car and encourage active travel and better forms of public transport to serve a city-region with twice the current population.   Such an integrated system could support implementation of the Local Industrial Strategy and increased productivity whilst meeting challenges of congestion, pollution and inclusivity. The report also includes recommendations on innovative financing which will be essential as national resources will be extremely stretched.

The proposed integrated transport system recognises that all forms of transport have their merits and that many journeys are multi-modal. The Oxford Metro, promoted through a 'smart' travel card of the type already used on Oxford's buses, would be implemented in five main stages as resources allow: (i) reduce space given over to cars; (ii) make the most of existing rail capacity; (iii) upgrade key bus routes; (iv) complete the upgrade with light rail; and (v) extend services to new settlements.

The Oxford Civic Society continues to have concern that 'making the most of existing rail capacity' may already have been compromised by current rail industry plans. How far *metro-isation* is constrained needs to be clarified.   The report focuses on rail opportunities and it is recognised that more work is necessary on reducing space given over to cars, upgrading bus routes and mass transit. In particular, if, disappointingly, opportunities to maximize the use of rail have been missed: it would mean that the complementary role of the bus (urban and inter-urban within the city region) would necessarily be that much larger.

Most importantly, the report demonstrates a vision of *metro-isation* that we would like to see in Central Oxfordshire. Overall, it is absolutely necessary to effectively link development planning and transport planning: the Oxfordshire 2050 Plan is a spatial plan, which will spatially interpret the Local Industrial Strategy considering environmental and social safeguards. *Metro-isation* would facilitate this by ensuring that development in appropriate places benefits from accessibility to a sustainable transport network.

We thank the URBED Trust for their continuing engagement in Oxford and Oxfordshire and look forward to discussions on this report with the Oxfordshire 2050 team, the URBED Trust and others.
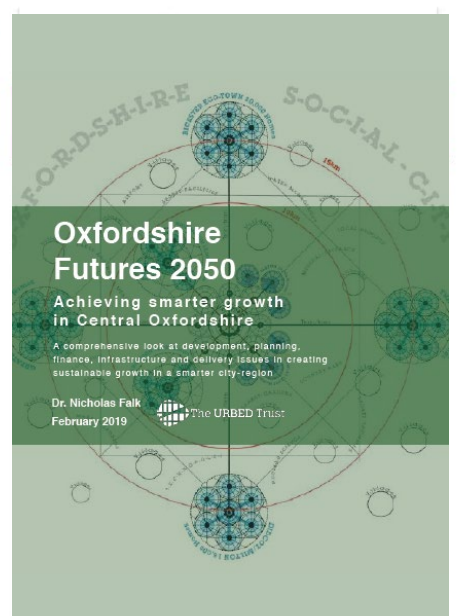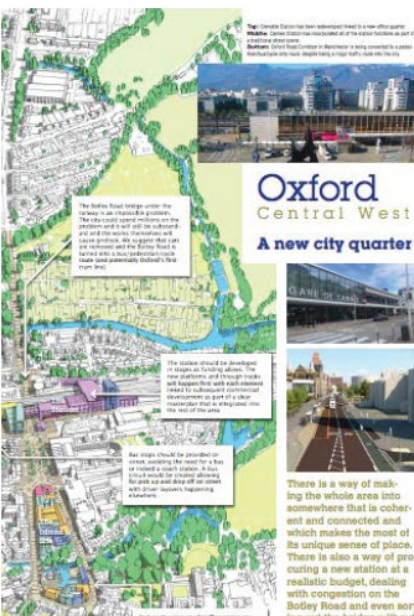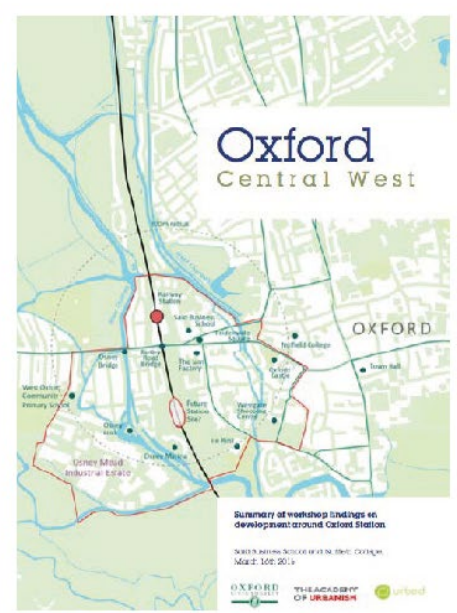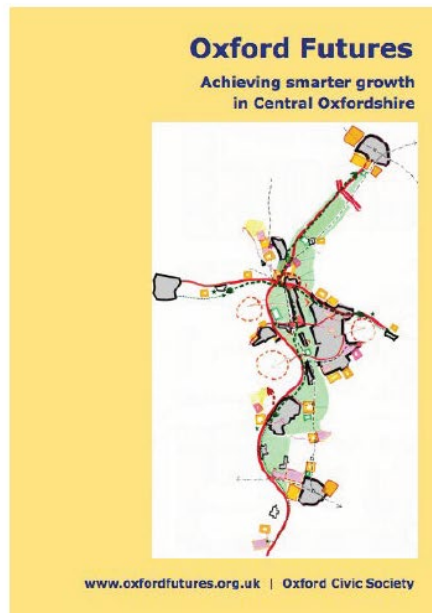
Ian Green, Chair, Oxford Civic Society

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www.oxfordfutures.org.uk | Oxford Civic Society

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A comprehensive look at development, planning, finance, infrastructure and delivery issues in creating sustainable growth in a smarter city-region

Dr. Nicholas Falk
February 2019
The URBED Trust

Executive Summary

This report deals with how Oxford and the surrounding area, which has been growing at 2.4% a year, can deal with the increasing challenges of congestion and pollution, and improve its productivity through appropriate transport investment. It proposes an integrated transport system called the Oxford Metro that will support a shift away from dependence on the private car towards active travel and better forms of public transport to serve a Metropolitan area with twice the current population during a period when national resources will be extremely stretched.
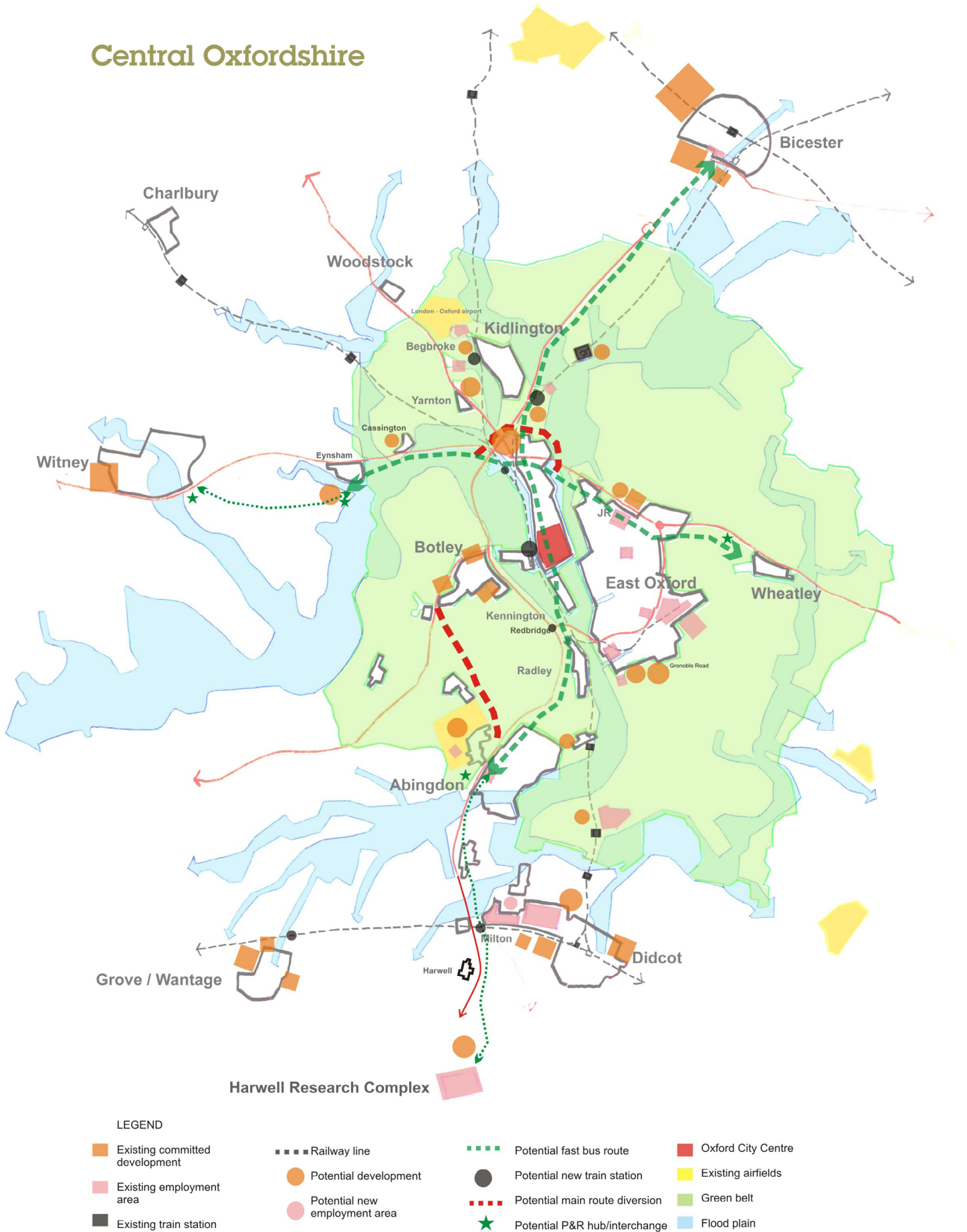
The report draws on national and international experience as an element in a Spatial Plan that will guide investment in Central Oxfordshire or the Oxford Metropolitan area in the period up to 2050. It follows up earlier consultations and workshops since 2015 under the theme of Oxfordshire Futures that have been promoted by Oxford Civic Society, The URBED Trust, and other partners www.oxfordfutures.org It also draws on inputs from many transport experts and active members of the local community. The proposals are summarized in a video on www.urbedtrust.com.

The report is in three parts, with exhibits which illustrate the main elements, and two technical appendices. The first part proposes a set of simple principles or criteria for assessing different scenarios that could also apply to other historic towns. Lessons are drawn from experience of sustainable development in comparable German cities. The second part sets out proposals for upgrading connectivity in stages, starting with what can be done in the short-term to make conditions better for pedestrians and cyclists in the city centre. The third part suggests how finance could be packaged from different sources, and the uplift in land values from development ploughed back in improved local infrastructure. As the situation is constantly changing and not all the reports referred to have been made public, the report shows how a different approach to spatial planning could work in the context of rapidly growing cities such as Oxford.

Appendix A examines the viability of opening the SpineLine, which adapts the German concept of 'Schnellbahnen' or SwiftRail. This would provide frequent suburban services to serve the Science Cluster between Kidlington and Bicester to the North and Didcot and Culham and Harwell to the South, as well as restore services on the branch line to Cowley. This would offer a cost-effective solution before enough funding is available to achieve the much more ambitious proposals in the Oxfordshire Rail Corridor Study (ORCS) rather as the Docklands Light Rail (DLR) did in regenerating the area East of Tower Bridge or the Overground has transformed mobility around London. Appendix B summarises examples from other cities of how innovation has been achieved in both technological and financial terms.

Central Oxfordshire

Charlbury

Woodstock

London - Oxford airport

Kidlington

Begbroke

Yarnton

Cassington

Eynsham

Witney

Botley

JR

East Oxford

Kennington

Redbridge

Wheatley

Radley

Grenoble Road

Abingdon

Bicester

Milton

Harwell

Didcot

Grove / Wantage

Harwell Research Complex

LEGEND

🟧 Existing committed development	▪▪▪▪ Railway line	▪▪▪▪ Potential fast bus route	🟥 Oxford City Centre	
🟪 Existing employment area	⬤ Potential development	⬤ Potential new train station	🟨 Existing airfields	
⬛ Existing train station	⬤ Potential new employment area	▪▪▪▪ Potential main route diversion	🟩 Green belt	
		★ Potential P&R hub/interchange	🟦 Flood plain	

Source: Jon Rowland

1. Making better strategic choices

Oxford lies at the heart of England and current (East-West Rail) and projected rail developments will increase further its importance as a transport hub, as well as being a leading world university and important business centre. It is also one of the least affordable places to live with great social disparities. Though developments are in progress to improve connections with Milton Keynes and Cambridge, and build another 100,000 homes, it is far from clear where the all the resources are going to come from. With an economic depression following the Covid-19 epidemic, priorities will have to be reassessed, and principles agreed before different spatial scenarios can be modelled and assessed, and funding attracted. In a previous report Oxfordshire Futures 2050, three basic principles were proposed:

■ Locating housing growth where the infrastructure can cope and where it will improve social balance by being affordable

■ Tackling congestion with proposals not just for the East-West rail link but also for improving local connectivity within Oxfordshire to cut car usage and hence pollution

■ Improving public confidence including restoring young people's hopes for the future and encouraging businesses to raise productivity and innovate.

These principles differ from the WebTAG system used by the Department for Transport to assess projects but are in line with the latest thinking from the National Infrastructure Commission, which is part of the Treasury. Putting more weight on economic and social impact, and less on saving travel time aligns with the definition of sustainable development and is consistent with reversing the drop in public transport usage and the importance of an early recovery plan to bring life back to the heart of Oxfordshire.

2. Upgrading connectivity

An integrated transport system recognises that all forms of transport have their merits and that many journeys are multi-modal. The Oxford Metro, promoted through a 'smart' travel card of the type already used on Oxford's buses, would be implemented in five main stages as resources allow:

i.   Reduce space given over to cars
ii. Make the most of existing rail capacity
iii. Upgrade key bus routes
iv. Complete the upgrade with light rail
v.   Extend services to new settlements

The immediate priority is to encourage active travel, walking and cycling by reducing space given over to parking, as Copenhagen has done so well. Transport and development must be joined up, including by maximising the value of Oxford Central station and its environs, not just as an integrated transport hub but as a high density mixed use quarter, like at Paddington or Kings Cross. A start could be made on introducing SwiftRail services running trains from Marylebone through to Cowley, and the route could serve as a launch pad for innovation.

Priority for buses or coaches (maybe public transport, to include trams) at intersections will help to restore reliability. Air quality would be much improved by the first phase of an Oxford Tram, which would run from the park and ride site at Botley to Oxford Station and the Westgate Centre. Later it would extend through Carfax to the hospitals and Brookes University and the Thornhill park and ride site, as part of the plan to remove intrusive buses from the centre. Eventually in the period 2030-2050 new settlements on the edge of the city would help finance further extensions.

3. Packaging finance

The key to what may be an ambitious plan is tapping all the available sources of finance, which includes charges on the uplift in land values.

- The report proposes pilot projects to test the feasibility of introducing variants of the German or Danish land value capture systems in the 80 hectares of under-used land around Oxford Station.

- A bridge that could carry a tram line connecting Osney Mead with Oxpens will greatly increase the development value of both sites, along with better connectivity with other parts of the Metro area.

- A development corporation can provide the powers and leadership needed to overcome the many difficulties holding back progress. Inspiration could also be drawn from Cambridge, which is much farther advanced.

- A taskforce led by representatives of the local academic, business and political worlds is proposed to get the development process underway and help drive it to completion.

Dr Nicholas Falk
October 2020

1. Making Better Strategic Choices

Radical changes to how government plans and evaluates transport projects are essential to coping with the imminent economic downturn, changing travel patterns, emerging climate crisis, and even possible civil unrest. After the Coronavirus epidemic, funds simply will not be available on the scale required for grand projects. Traditional appraisal systems will no longer be trusted. What public capital funding there is will tend to be directed towards the North and areas that can help rebuild the British economy. Achieving sustainable growth when so much capacity has been damaged means that complex and longer-term projects will be put on hold for the foreseeable future.

Consequently to change direction any plan or strategy must be incremental in concept and opportunistic in delivery. It must also contribute to creating a 'smarter city' by making the most of all forms of technology, including travel options. Three questions for strategic planning need to be answered: which priorities are likely to emerge, what can the UK learn from cities in more advanced economies such as Germany; and how can British communities make the most of our historic and key mid-sized cities to recover the country's position after lock down?[1]

1. This report has been through many drafts, with helpful advice from transport experts Ian Baxter, Reg Harman, Peter Headicar, Andrew Pritchard, and encouragement from senior members of Oxford Civic Society.

a. Reconsidering priorities

Ambitious proposals have been put forward for building 100,000 new homes in Oxfordshire on the back of better links between Oxford, Milton Keynes and Cambridge. This forms part of an Arc of opportunity around London, where demand for housing is particularly high.(Exhibit 1) There are now serious plans for upgrading parts of the Oxfordshire rail system that are set out in the Oxfordshire Rail Corridor Study (ORCS). These require four-tracking the railway between Oxford and Didcot, and redoubling the whole of the Cotswold Line to Worcester, where a house sells for a quarter of the cost in North Oxford.[2] At the present time political priorities are likely to favour projects that upgrade mobility for people living in rural areas, and so cities could lose out, despite their economic importance.

However there are strong arguments for projects to improve connectivity within the metropolitan area. In the past in the UK transport projects have been assessed in terms of the ratio of benefits to costs, and most weight has been given to saving time. However a new report from the National Infrastructure Commission recommends focussing separately on impacts on jobs and wellbeing to meet the needs of the

2   . Ian Baxter, article on Task Forces in Modern Railways, August 2020 and North Cotswold Line Transformation: strategic outline business case, SLC Rail, December 2019
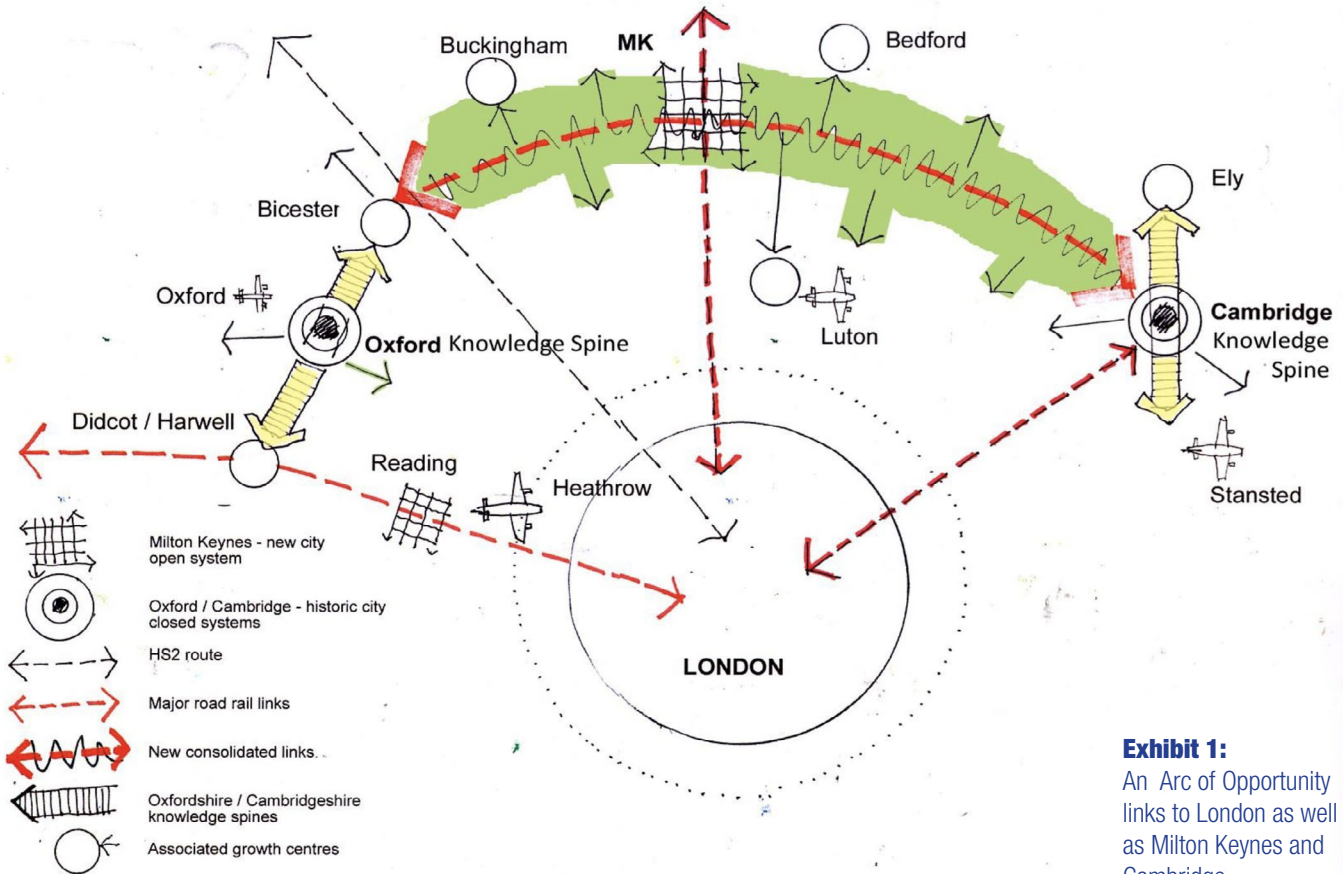
Exhibit 1:
An Arc of Opportunity
links to London as well
as Milton Keynes and
Cambridge

Midlands and the North.3 As government departments compete for extremely limited funds, there is also likely to be more interest in schemes that attract private investment by offering wider and more immediate benefits, as well as discharging political obligations. Financing rail projects when public transport is currently seen as the last resort due to Covid-19 issues and when demand has fallen drastically will only be feasible if a truly reliable, safe and attractive service can be offered to compete with the convenience and perceived safety of using a private car.

More innovative financing principles will be required that have worked elsewhere, as argued in Oxfordshire Futures 2050.4 Government can then share the bills with
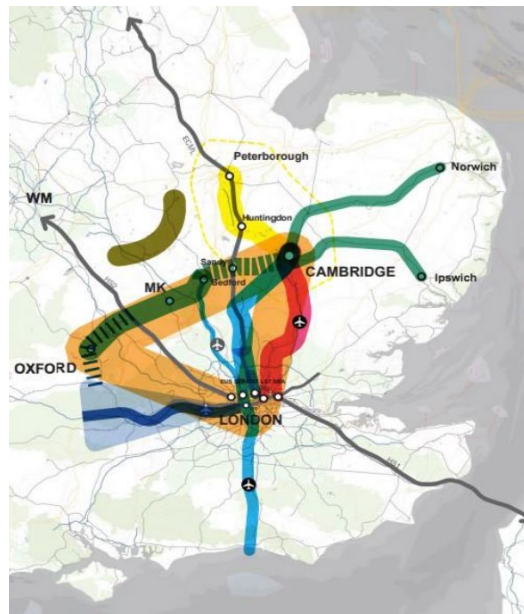
3   . NIC, Rail Needs Assessment for the Midlands and the North: interim assessment, 2020

4   . Oxfordshire Futures 2050: achieving smarter growth in Central Oxfordshire, The URBED Trust, 2019 www.urbedtrust.com
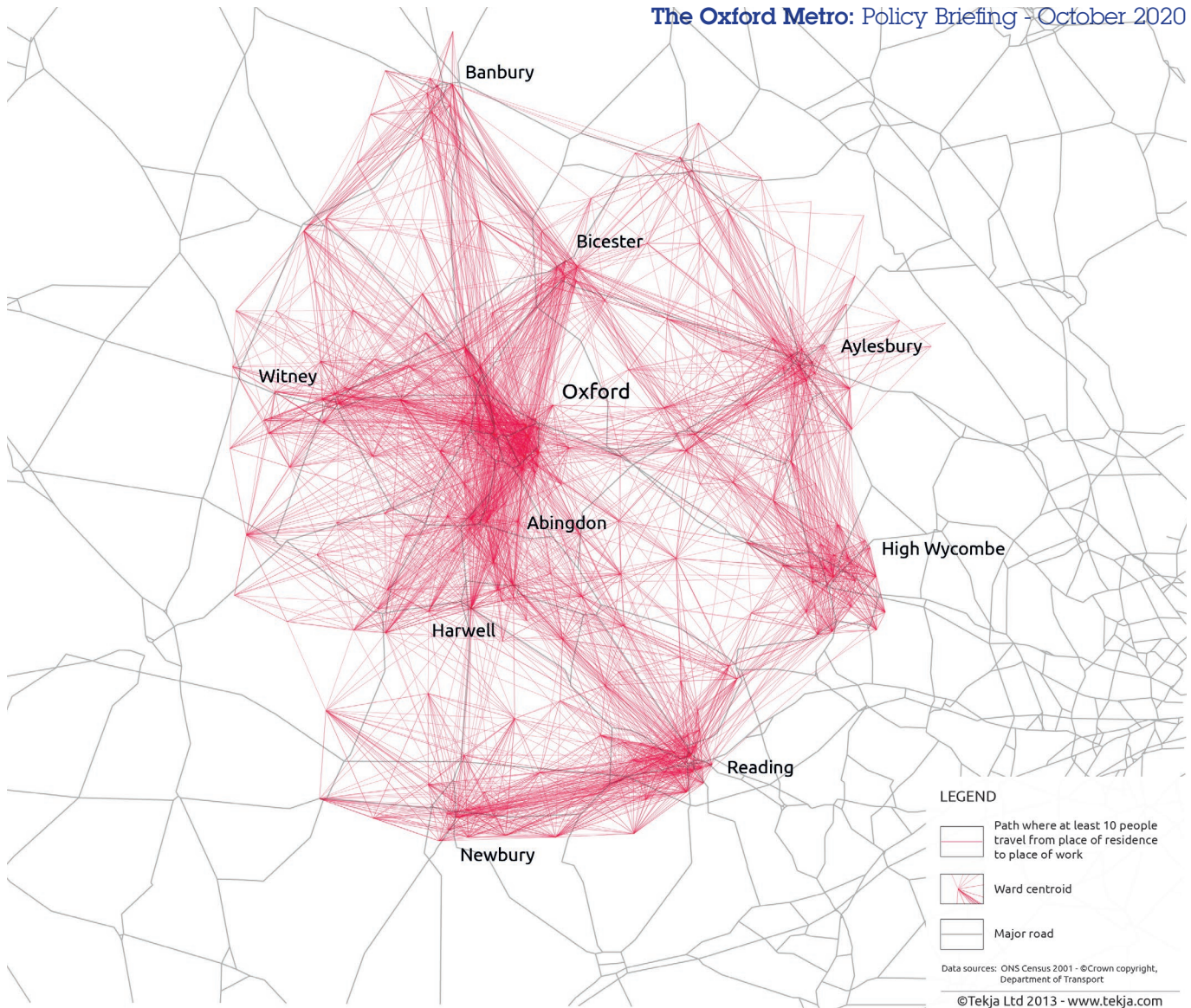
Exhibit 2:

The densest traffic flows are on the roads around Oxford

private investors, as has been done at Chiltern Railways. Limited national funds would go to areas where the principal stakeholders, such as landowners and local authorities, agree over what needs to be built, and where private funding for development is available.5 There will probably be a bias away from the prosperous Southern half of England to rebalance the country, and a general desire for innovation not a return to business as usual.

Proposals for investment in and around Oxford therefore must be of national or international importance in restarting a stalled economy, as well as a prototype for

building affordable and well-designed low carbon housing on the scale required.

Firstly, Oxford is at the heart of the nation's infrastructure, and road capacity is overloaded, especially along the A34 which also forms part of the Oxford ring road. (**Exhibit 2**) Investment is urgently needed to relieve congestion and pollution in the centre and to get people out of their cars to retain the calm and cleaner air experienced in the 'lockdown.' This will help one of England's most important historic cities attract visitors to return and spend (and recruit a new generation of foreign and post-graduate students and teachers, who cannot afford to work or live in Oxford any longer.

Secondly, improved connectivity is vital to expanding the knowledge-based economy that functions along what has been called

5 . Nicholas Falk, Sharing the Uplift from Land Values, Town and Country Planning Association Tomorrow Series Paper 20, 2019

7

Survey Population Per Postcode
Number of Firms
- • 1
- ● 5

▢ Oxfordshire Boundary

NOT TO SCALE
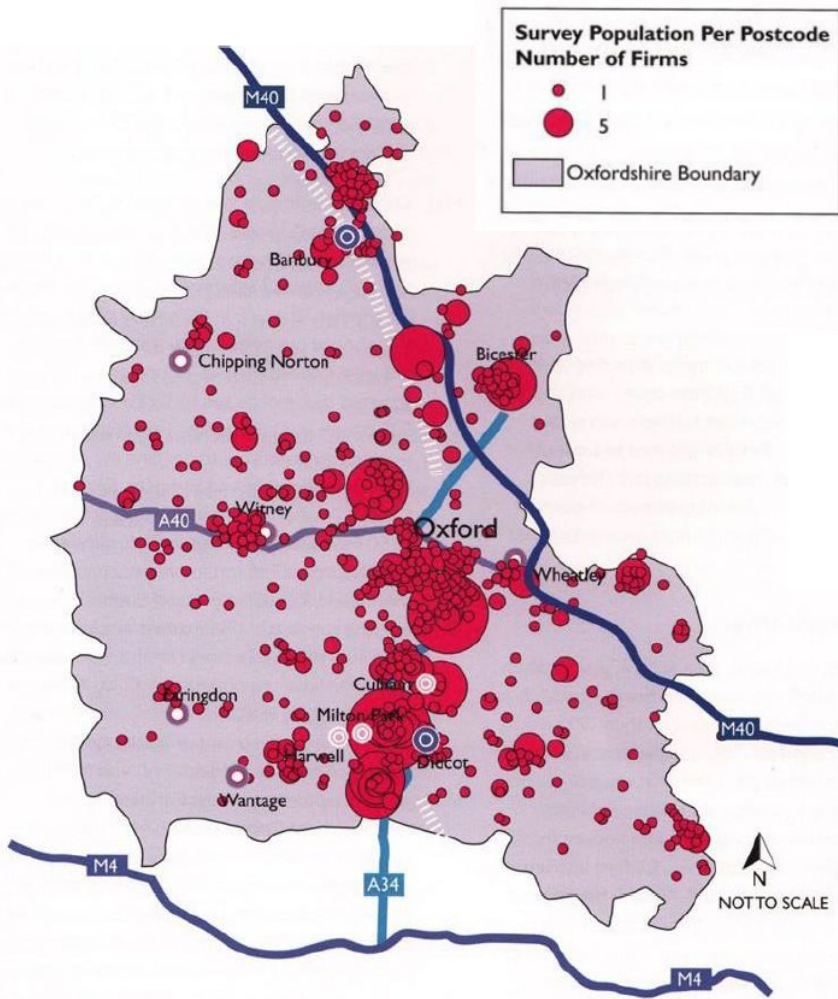
Exhibit 3:
Science based firms cluster around the A34

the 'Science Spine', and which is in a highly globally competitive sector. (Exhibit 3) One of the main recommendations in the recent Oxfordshire Rail Corridor Study (ORCS) was to examine the feasibility of the four-tracking proposals from Oxford to Didcot, which is seen as a precondition for any improvements elsewhere, along with the expansion of Oxford's Central railway station.6 This was drawn up at a time when transport demand was expected to outstrip rail capacity. The report concludes that both recommendations need to be actioned at the same time (nothing can be done without doing everything), and the costs are likely to be high.

But transport projects must meet

changing political priorities and financial circumstances. They need to be judged against social and environmental as well as economic objectives to be ranked as 'sustainable' or 'resilient', and several possible objectives or criteria are relevant. Proposals also need to be considered within the wider issue of infrastructure capacity and available funding sources for urban development. Though it will not be easy to achieve, transport projects must be parcelled up and phased so that they are tied in to major development schemes, as, for example, the National Infrastructure Commission has recommended and the draft strategy from England's Economic Heartland proposes.7

British cities have lagged their equivalents in other European countries in both economic and social terms, as comparisons such as those by the Centre for Cities have vividly shown.8 In part this is due to poor connectivity. Investment in transport and other infrastructure needs to be joined up with development for both housing and employment to secure better returns. To recover from 'lockdown' governments of whatever party will be expected to consider the 'big picture' and long-term objectives. Innovation will be essential both to do more with less, and to avoid other unforeseen events or consequences from poorly planned development.

Oxford's Spine Line would improve connections in the cluster of knowledge-based businesses between Kidlington/Begbroke (or possibly Hanborough) and Harwell/Milton Park (or possibly Didcot), and should be the first step in making an integrated Metro system work. As such it could form an important 'test case' for a different approach to strategic planning that would suit the current political and economic

7. Draft Transport Strategy, www.englandseconomicheartland.com, July 2020

6. See papers for Oxfordshire Growth Board, and article in Modern Railways April 2020 by Tom Milner and James Abbott, Coordination is the key.

8. Paul Swinney, Competing with the Continent: how UK cities compare with the European counterpartsCentre for Cities, 2016

Langford Lane
North Kidlington

Begbroke Hill

P&R A40W Eynsham

Northern Gateway

Kidlington

Bicester Village

Islip

Oxford Parkway

Summertown
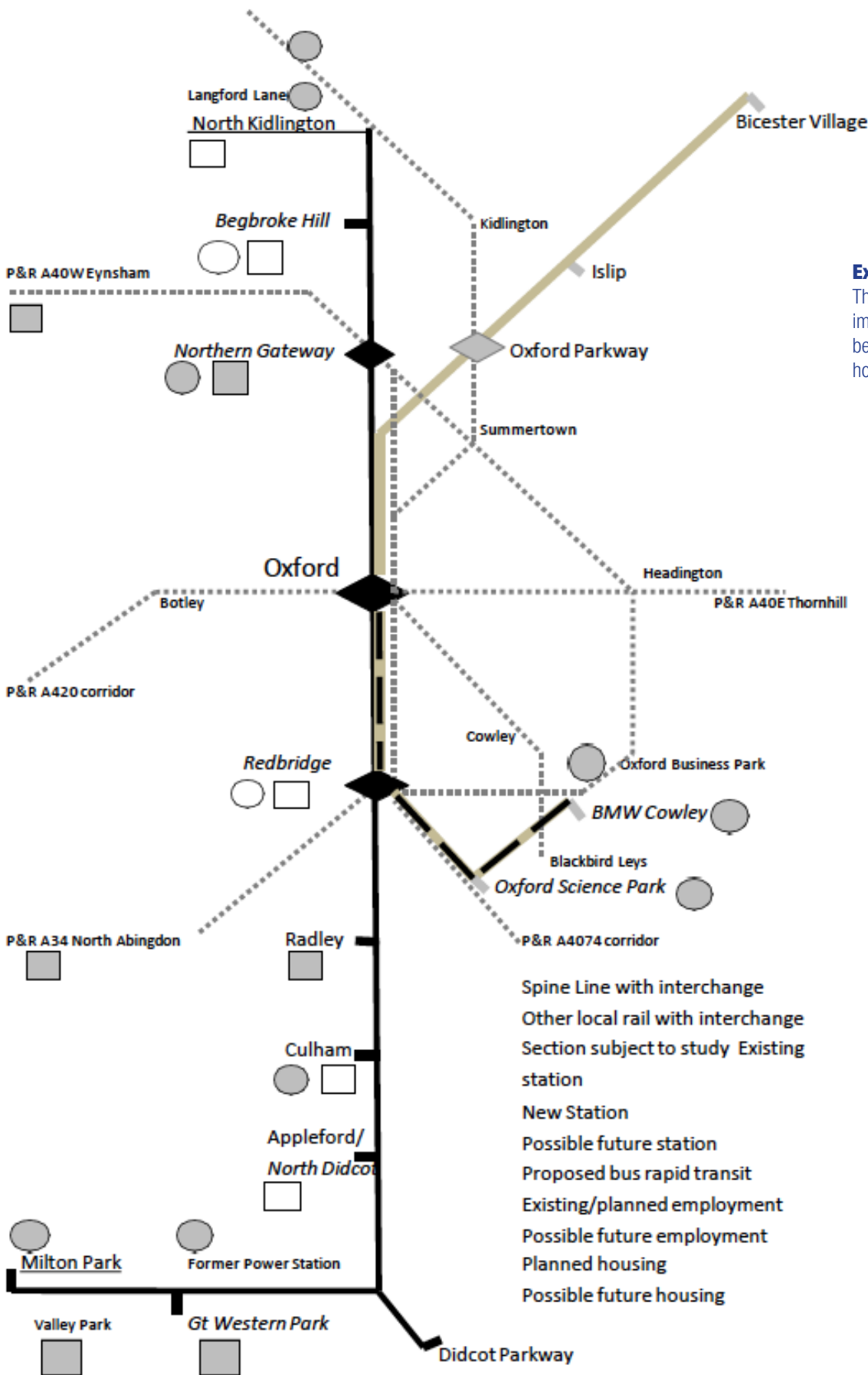
Exhibit 4:
The SpineLine would improves rail services between jobs and new housing

Oxford

Botley

Headington

P&R A40E Thornhill

P&R A420 corridor

Cowley

Redbridge

Oxford Business Park

BMW Cowley

Blackbird Leys

Oxford Science Park

P&R A34 North Abingdon

Radley

P&R A4074 corridor

KEY

Spine Line with interchange
Other local rail with interchange
Section subject to study Existing station
New Station
Possible future station
Proposed bus rapid transit
Existing/planned employment
Possible future employment
Planned housing
Possible future housing

Culham

Appleford/
North Didcot

Radley
Milton Park
Redbridge

Milton Park

Former Power Station

Valley Park

Gt Western Park

Didcot Parkway

Exhibit 5:
Many English towns could become Garden or Connected Cities. Source: Peter Headicar

situation. By joining up development and infrastructure improvements a much smarter or fairer form of growth would be achieved, and many of the objections to growth overcome. Indeed, it would rekindle faith in a better future, rather than yearning for the past or being derailed by unforeseen events. By running reliable and integrated public transport services within urban conurbations or metropoles congestion and pollution can be reduced, and British city centres can offer a comparable quality of life to their Continental counterparts.

The short illustrative case study in Appendix A to this report suggests in summary that by investing in local transport greater benefits could be achieved faster and that some of the costs could be recovered from associated developments. Similar arguments apply to many other mid-sized

or Metro towns and cities. This includes the Key Cities network of medium sized cities such as Preston and Gloucester, where there is also scope for building higher density housing along improved transport corridors. It also includes major towns that have the potential to grow by applying Garden City or Connected City principles, which would use the uplift in land values to fund improved connectivity. (**Exhibit** 4)

b. Making the most of metro rail lines

Historic cities such as Oxford are one of the UK's most important assets in restarting the national economy. As well as their special heritage as cathedral and university cities, they provide services that can be exported, from tourism and higher education to innovations in growing fields such as health or electric vehicles.[9] They face similar challenges to a much larger number of key or mid-sized towns and cities that are also facing the challenge of improving their transport systems after lockdown. Key Cities are smaller than Core Cities, such as Bristol, but perform a similar range of functions, such as serving as railway junctions or centres of learning. (**Exhibit** 5)

Achieving a modal shift away from the private car for anything other than the shortest of journeys is best provided by services on dedicated rail lines. SwiftRail, a concept devised by the well-respected transport planner Reg Harman along with economist and strategic planner Dr Nicholas Falk. SwiftRail is modelled on the successful German Schnellbahnen. This system for using heavy rail services to serve urban conurbations is also used in Austrian and Swiss metropolitan areas.[10]

9. Industrial Strategy: the five foundations, www.gov.uk

10. Reg Harman and Nicholas Falk, SwiftRail and Growing Cities, Tramways and Urban Transit, December 2015

The distinctive elements are:

a) Routes linking city stations to suburbs and satellite towns within the catchment areas

b) Stations located and designed as focal points for their area (not just car parks).

c) High standard but simplified signalling on exclusively Swift Rail lines.

d) Multiple unit electric trains with high acceleration and deceleration rates, including regenerative braking, and with high-density interiors

e) High-frequency services throughout the week, normally 15-minute intervals.

f) Integration with local bus and other transport services through links at stations, common ticketing and common promotion.

g) Planned and funded by locally-based corporations, linked to development, with participation of bus or rail companies and/or local authorities.

h) Managed by a locally-based company or development corporation.[11]

The SwiftRail concept offers four main advantages over conventional rail proposals:

1. It provides improved services and shorter journey times in the suburbs of a metropolitan area, where housing is in greatest demand, and hence should appeal to car users, or people who want to use bikes for part of their trips, thus securing modal shift in areas where congestion is serious.

2. It concentrates on reducing short distance car use and hence the congestion and pollution that afflict many English conurbations. It responds to the imminent Climate Emergency, and generates multiple benefits, such as improving public health, by reducing air pollution and the associated incidence of deaths from Covid-19.

3. It forms part of a growth plan in which housing is built to bring supply into line with demand in areas where the infrastructure capacity can cope. It thus forms part of an integrated system that uses rail on high density corridors where usage will be sufficient to cover the running costs.

4. It is relatively low cost and can be implemented quickly because it makes use of existing under-used railway lines and stations , including reopening ones that were closed to passengers. It can also take advantage of longer-term projects for upgrading rail services.

In a series of review articles in the Academy of Urbanism Journal and Town and Country Planning Dr Nicholas Falk set out what medium sized cities could do to match their European rivals such as Freiburg in Germany, with particular reference to Oxford.[12] Economic comparisons for example by the Centre for Cities, show that outside London British cities generally do worse than their Continental equivalents. In part this is because they are tightly bounded and poorly connected to others.

The historic German university city of Heidelberg rates above Oxford in patents per 100,000 inhabitants in part because of its location in the high-tech powerhouse of Baden-Württemberg, and its links by rapid trams through the countryside to the major city of Karlsruhe.[13] Another German example

11. Taken from evidence submitted to Department for Transport enquiry into light rail SwiftRail and Rapid Transit: learning from Europe, May 2019

12. See for example Smarter Urbanisation and Rapid Growth, Here and Now, AoU journal 12 Winter 2018 and Location, Location, Location, Town and Country Planning May 2017

13. Hugo Bess, Competing with the Continent: how do UK cities match up to the rest of Europe, Centre for Cities, 2016

is the North Rhineland trio of Worms, Mainz and Speyer, a group of historic towns that has similarities with conurbations such as Gloucester and Cheltenham and the Oxford region, and that are connected by the Schnellbahnen rail system.

A national policy for key 'Metro cities' would include towns in East Anglia focused on Cambridge, such as Ely, or around some of the places in the Key Cities network such as Norwich, Preston and Plymouth. Battery or even hydrogen powered trains could be feasible over short distances, as Viva Rail are demonstrating, using converted District Line trains. The concept may also apply to some areas with priority for regeneration such as Sunderland or Doncaster where old freight lines could be returned to carrying passengers, as the government has suggested. German and French experience suggests that tram systems can also be viable in relatively dense and high value corridors such as Hertfordshire where the scope for land value capture is considerable and towns are close together.[14]

c. Underpinning urban growth

International research suggests that larger metropolitan areas generally perform better in economic terms because of what economists such as Bridget Rosewall refer to as 'agglomeration benefits."[15] Larger dense urban areas suit integrated public transport systems that cut car use and can make larger cities more sustainable, as studies for the European Union have shown.[16] Notable success stories include Vienna, Copenhagen, and Bilbao, all of which suffered from economic decline until a few decades ago, and which have 'tamed the car' in their city centres. Similar principles were used in

justifying investment in London's CrossRail line.

Research for the OECD comparing some 1200 cities across 29 countries suggests that similar benefits can come from 'combined' authorities where local stakeholders work together, for example in planning and funding better metropolitan rail systems.[17] The draft transport strategy for the Heart of England, which includes Oxford, offers hope for a coordinated approach, and stresses the importance of developing East-West links.[18] Efforts are also underway to improve connectivity in some British regions through light rail, such as the West Midlands,[19] but the working examples are still rare. The White Paper *The Future of Planning* includes important proposals for an **Infrastructure Levy** as a charge on the value of new housing aimed at supporting development in identified Growth Areas.

A recognised obstacle to growth in the UK is securing collaboration between local authorities, especially where there are historic conflicts between urban and rural dwellers, as in Oxfordshire, and funding is tight. Economist Kate Barker has set out possible criteria for success in a short book which makes the case for a realistic as opposed to an ideological approach.[20] Squabbles over the Devolution White Paper however will make the situation even worse. Though British local authorities are relatively large compared with other European countries, the political and funding systems tend to make them adversarial and over-dependent on national government. Public investment is highly constrained and most goes into a few big projects. Local improvements can be delayed for decades due to the cumbersome system for planning

14. Reg Harman, Transit through the Metropolitan Belt, www.tauonline.com, September 2016

15. Geoffrey West, Scale: The universal laws of growth etc , Penguin 2017

16. The State of European Cities 2016: cities leading the way to a better future, European Union

17. Governing Cities, OECD, 2016

18. Draft Transport Strategy, www.englandseconomicheartleand.com July 2020

19. http://wmre.org.uk/strategy/wmris

20 Kate Barker, Housing: Where's the Plan, London Publishing Partnership, 2014

transport improvements.

or what is known as Transit-Oriented Development (TOD) in the USA, would be considerable. By concentrating much needed new housing around transport nodes, such as existing and new railway stations or transport hubs, traffic can be diverted from congested roads, avoiding pollution, and reducing journey times. By focusing on cities where property values are high, an extra source of funding can be tapped without the opposition that applies to most new forms of tax. Collaboration could be secured by using the proven mechanism of development corporations and tapping the potential uplift in land values once schemes had been approved and infrastructure upgraded. This was the argument that won the 2014 Wolfson Economic Prize in which Oxford was used as the testcase for developing what was called Uxcester Garden City.

There are plenty of European models for using investment in transport infrastructure to underpin the growth of historic cities. For example lessons can be drawn from French cities such as Montpellier, the fastest growing city in France, Strasbourg, or Grenoble, which is a leading science or smart city and one of Oxford's twin cities.[21] In Copenhagen land value uplift has funded their first Metro line, thanks to the development of the new town of Orestad on the way to the airport. There is also a rapidly growing network of places in the UK interested in these ideas, and experience is being shared through webinars.[22] (see www.connectedcities.org.uk and www.transportfornewhomes.org.uk)

c. Learning from Germany

In the recent past England has become very parochial, but the UK is likely now to want to learn from Germany, if only because they have had less than a fifth of the deaths from coronavirus and have had a stronger economic record over the last fifty years or so. German success is partly attributable to their Federal political structure and less centralised planning system, which has been joining up development with transport for over a century. Though there are still major social differences, the UK can learn from the successful renaissance of former East German cities such as Leipzig, which won major investment from BMW, as well as from cities with greater similarities to Oxford such as Freiburg.

The German S-Bahn (Schnellbahn means fast rail) serves the major cities but also provides high density services across smaller city regions. These have benefitted from inspirational municipal leaders who have promoted concepts such as tram-trains in the dynamic cities of Karlsruhe and Kassel. These cities made use of former rural railways of the type that were closed in Great Britain after the Beeching report, some of which still exist and are being reconsidered. The Campaign for Better Transport has identified over 200 potential projects with an expected capital cost of between £9 and £17 million per mile. In the case of Oxford the costs could be much lower so long as areas that are liable to flood are avoided such as alongside the former line to Witney and Fairford. (see Appendix A)[23]

Comparisons with Germany may seem unfair as their cities have much more control over their growth, with decentralised powers, regional planning and local sources of finance.[24] But they too have had to fight to restore damaged city centres, and the

21. See chapter 9 France uses transport to develop and regenerate cities in Peter Hall, Good Cities Better Lives: how Europe discovered the lost art of urbanism, Routledge 2013

22. (see www.connectedcities.org.uk and www.transportfornewhomes.org.uk)

23. Financial Times February 17th 2020

24. Nicholas Falk, Land for Housing: sharing the uplift in values from growth or regeneration, URBED Trust 2019

absorption of the former East Germany. Germany has combined increasing levels of car ownership with falling levels of usage in many places. It has also achieved much higher levels of economic growth without house price inflation. Most people live in flats, often rented, but as in the UK wealthier people have moved to detached houses in neighbouring small towns and villages. That is why comparisons between Oxford and university cities such as Freiburg are highly relevant.
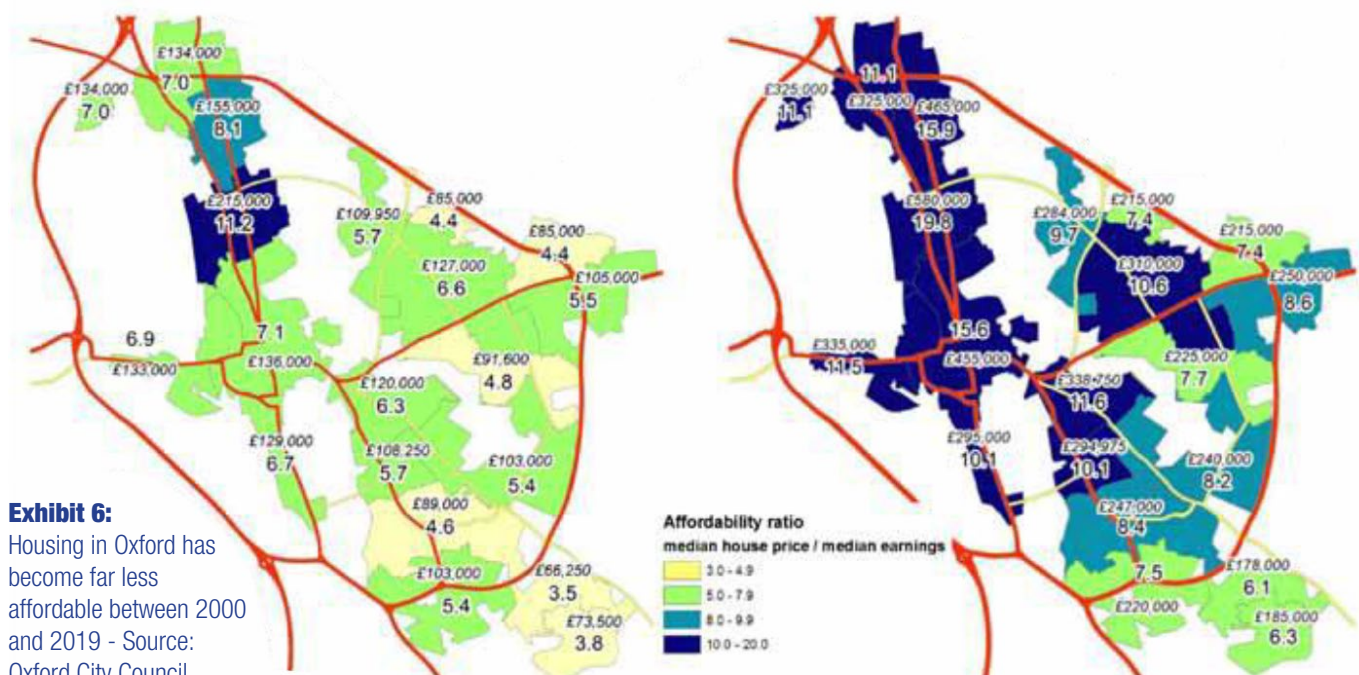
Traffic-calmed streets in built-up areas are pedestrian and cycle friendly and provide a healthier environment for children close to the dense centre. As Germans generally defer buying their own homes until they have a family, those for sale are much larger and better specified. The resulting savings help to finance the first class infrastructure, helped by a system of local savings banks or Sparkassen and the state investment bank KfW. High rise towers are rare, and four storey walk-up flats are much more common.   When built round courtyards, as in Freiburg, a superb quality of life is possible, and people are healthier and less stressed.. German local authorities have both the powers and resources to assemble

land and to charge developers for the provision of infrastructure.[25] There are much closer relationships with businesses and universities, encouraged by the 72 well-resourced Fraunhofer Institutes on which the British Catapult system is modelled.[26]
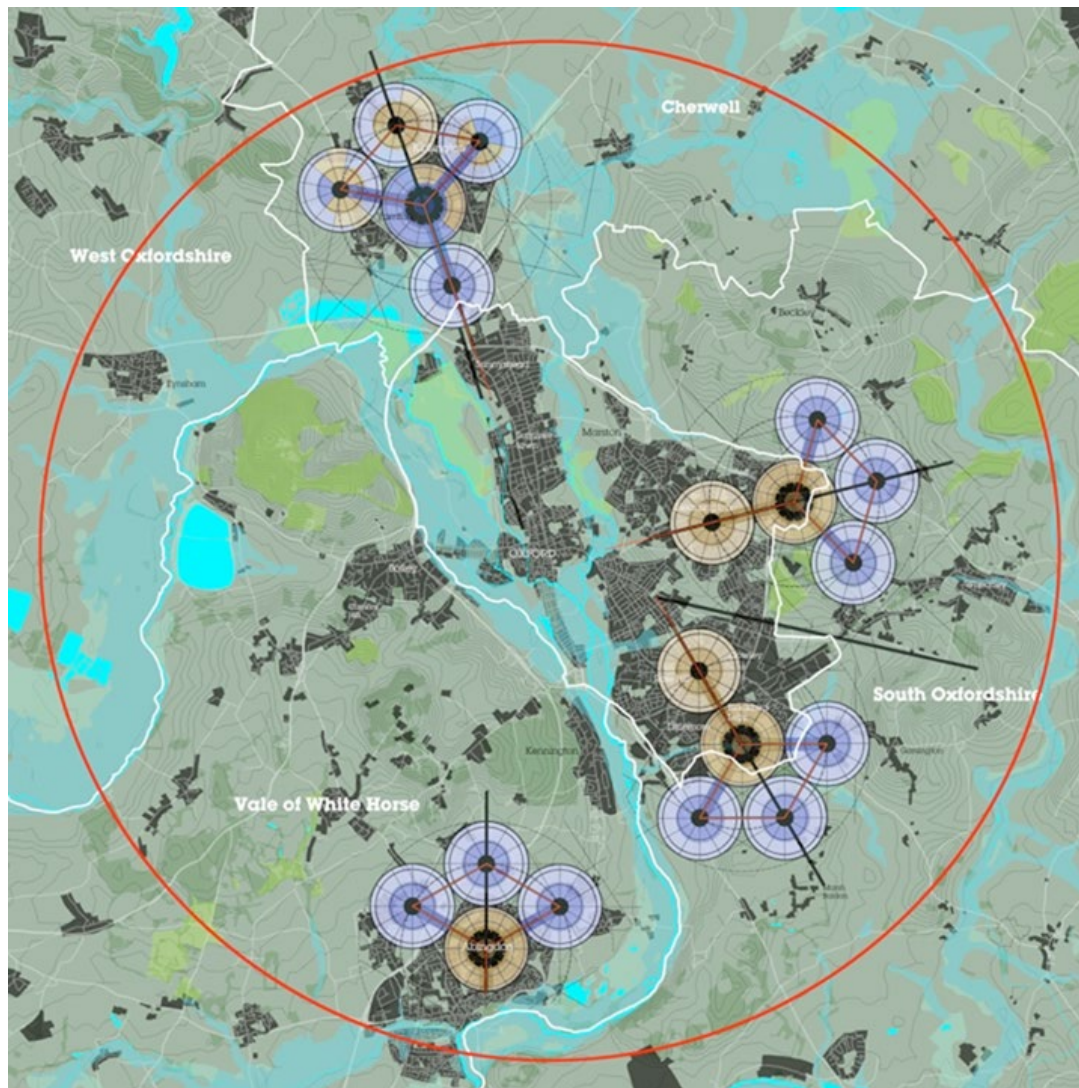
Germany has avoided the waste of resources that the UK's cumbersome housing and planning system has produced. Instead of fruitless competition between different private transport operators), the city councils control local public transport (the metro system or Stadtbahn, and the buses) while the 16 state governments ensure there is a good regional service. So the system provides an effective and dense network throughout the core city and the catchment region, focused on a central rail station sitting at the heart of the city and its local public transport. The S-Bahn lines around German cities offer fast, frequent, and direct links with the

25. The German system is explained in a number of case studies in the reports referenced here.

26. See chapter on Boosting Economic Growth in Germany and also Freiburg: the city that did it all in Peter Hall, Good Cities Better Lives: how Europe discovered the lost art of urbanism, Routledge 2013

Exhibit 6:
Housing in Oxford has become far less affordable between 2000 and 2019 - Source: Oxford City Council

Affordability ratio
median house price / median earnings

- 3.0 - 4.9
- 5.0 - 7.9
- 8.0 - 9.9
- 10.0 - 20.0

Proposed
Neighbourhood

Existing
Neighbourhood

Exhibit 7:
The 2014 Wolfson
Economic Prize scheme
doubled housing within
six miles (10km - the red
circle) of the centre.

towns in their catchment area resulting in less congested roads. In Freiburg car use has been kept constant for forty years while the population expanded.

This applies to most German examples, and to Swiss conurbations such as Basel and Zurich and some Austrian cities (and is being promoted in the West Midlands Rail Investment Strategy). S-Bahn service timetables are coordinated with those for tram and bus and operated by easily accessible low floor train units, with fast starting and stopping. The tickets are generally much cheaper than in the UK and allow transfers across the local system. Stations are designed to enable easy transfers between modes, including plenty of cycle

parking, often with underpasses that enable entry from both sides, and with shops to provide for daily needs.

e. Achieving agreement

The key to the success of a SwiftRail system in the Oxford area lies in an integrated system with turn-up-and-go frequencies, which could be implemented rapidly, given the political will. Investment in local transport in the UK has been limited in the past not just by Departmental budgets but also by the peculiar appraisal system known as WebTAG. This gives priority to time savings over other possible benefits and

tends to favour road over rail. It does not give enough value to innovation and economic growth, or to development and environmental improvements such as cleaner air. Nor does it give enough weight to social justice such as improving the opportunities for poorer people to access jobs and services within the agglomeration. The NIC has recently recommended changing the system to take account of multiple criteria, which would benefit light rail and suburban rail projects, and Oxford should be used to evaluate different scenarios. [27]

Strategic spatial planning needs to complement the National Policy Planning Framework and Local Plans. For better long-term planning, tight administrative boundaries need to be reconsidered. In Oxford, as in many cities that are both historic and well-connected, there are strong pressures from housebuilders for developing on the edge of the hundreds of small surrounding villages, as these offer easier profits. The private car is used as the main method of transport outside the centre where cycling has long been popular. Development has leapt over the green belt, and housing has become particularly unaffordable over the last twenty years, creating excessive social disparities between the North and South of the City, (**Exhibit 6**).

Local Plans for the period to 2030 are far advanced in most of Oxfordshire. Further work to supplement proposals in the various local plans is now needed to 'join up' transport improvements with potential strategic development sites and most importantly make the most of under-utilised land that is close to transport links. It is both wasteful and unjust to rely largely on projects put forward by private developers and landowners, as has been happening in recent years, when major transport investments are being considered. The plan for Uxcester

Garden City used a 10km or 6 mile radius around the centre of Oxford to identify the best sites for housing development as this is the distance people typically travel when they move home and want an easy commute. Some of these could be 'early wins'[28]. (**Exhibit 7**)

Oxfordshire suffers from the fractured nature of the political and planning systems. So while it looks as if some Local Plans, such as for Cherwell, favour ConnectedCities, the local authority of South Oxfordshire which encircles much of Oxford city wants to concentrate development around Didcot and the science centre at Harwell and has been opposed to growth impinging on rural villages. The main A34 road between Bicester and Didcot is over-loaded much of the time. Neither the Harwell Science Centre nor the popular trading estate of Milton Park have a station, though there is an old line running to the old MoD depot, as well as the lines that formerly delivered coal to Didcot Power Station. The science cluster at Culham, with its beautiful station by Brunel, has been ignored in the past, but now will benefit from a contribution of £13 million from development, which is almost enough to fund a passing loop, and enable trains to stop more frequently.

The national government has understandably concentrated on an Arc running between Oxford, Milton Keynes and Cambridge.[29] However, relatively few people live between Bicester and Milton Keynes, except in isolated villages. Hence there is unlikely to be sufficient demand to support complete 'new towns' around Oxford, as the government originally conceived. Proposals for development at Chalgrove airfield may not be sustainable as the site is too isolated and so new housing would be car dependent. A better option is the Garden Village being

27. NIC, Rail Needs Assessment for the Midlands and the North: interim assessment, 2020

28. Nicholas Falk and David Rudlin, Uxcester Garden City, 2014 www.urbed.coop,

29 The Oxford-Cambridge Arc: government ambition and joint declaration between government and local partners, MCLG March 2019

promoted off the A40 at Eynsham which the ORCS suggests could make use of an upgraded station several miles away at Hanborough. However, there are good bus services and the A40 is being dualled, so increased local rail use is doubtful, except to London, and the costs of dualling the line from there into Oxford are high.

Further growth is constrained by the extensive Oxford greenbelt. Better and faster returns could come from investing in development opportunities through planned 'urban extensions' alongside railway stations. This would put priority on sites such as South of Grenoble Road, which is not far from the freight-only line to Cowley used by BMW who assemble the Mini close to Oxford. Another obvious opportunity is around Oxford Parkway on the line to Bicester where five trains an hour are proposed in ORCS. It could also lead to national interest in Oxford Station, which is the principal bottleneck. A more ambitious but equally important area is due North of Oxford at Kidlington and Begbroke on the Banbury line.

Expanding capacity at Oxford Station creates a major funding issue as new platforms and lines are required. Though masterplans have been agreed in the past, there was said to be a £40 million gap for rebuilding the station. The stated priority in the ORCS is doubling capacity on the 10-mile line between Oxford and Didcot and a series of 'seven railway hubs' have been proposed to meet the expected growth in demand. Four-tracking the line would create more pathways, including the frequent freight trains running from the docks at Southampton to the Midlands and beyond as well as cross country passenger trains. It would also make it easier to serve intermediate stations such as Culham, another science centre. But this is likely to cost over half a billion pounds, and the proposals do not appear to have considered other options that may be easier to achieve in the short and medium terms.

Each of the stakeholders has different

priorities and at present there is no mechanism for aligning all the interests. From the community's perspective the priority is probably to tackle congestion and pollution in the historic city centre of Oxford (along with shorter journey times along the congested radial routes).. This requires taking traffic off the surrounding roads and reducing the number of buses passing through the centre. It should include taking the tourist coaches out of St Giles to a peripheral location, such as a park and ride site at which proper facilities could be provided such as at Botley. Members of Oxford Civic Society have long called for something like in Grenoble, one of Oxford's twin cities, where the centre is now traffic free thanks to a high quality tram network. Grenoble is taking many other measures to make it a Smart City by restricting pollution from vehicles to improve public health.[30] From the City Council's viewpoint, the objective is likely to be to provide affordable housing wherever possible, including the site South of Grenoble Road that has long been controversial. The city council has a number of plans for improving the urban environment, but is very short of the resources to implement them.

Oxford University naturally wants to retain its position as a leading world centres for research and post-graduate education but owns much less land than the 39 colleges. Prior to the coronavirus epidemic it favoured development on land it largely owns not far from Oxford Station in Osney Mead as well as in Begbroke, where a science park has been started. There it is in a joint venture with the property arm of the Legal and General Insurance Company. A development like the one by Cambridge University at Edgington in North West Cambridge could provide housing for both staff and post-graduate students.

Plans may be delayed now it is easier to

30. Nicholas Falk, Smart Cities: capitalising on the digital revolution, www.urbedtrust.com 2020

reuse space in buildings such as shops and offices in the city centre. This could allow land near the station to be released for commercial or residential development, or even a major research centre like the Crick Institute next to Kings Cross Station. This might bring academic and commercial researchers together, perhaps on some aspect of sustainable transport such as energy. Indeed the Innovation Corridor could provide demonstration projects for 'smart technologies' such as hydrogen or battery power for commercial vehicles, where Oxford has a lead, but where Germany is investing £9 billion in 'green hydrogen'.

Conclusion

Oxford needs to grow in a sustainable or smarter way, which depends on joining up development with infrastructure capacity, as in other mid-sized or historic cities. Lessons can be drawn from German and other Continental cities, which have invested in better local transport systems, including frequent services on suburban rail.

There are major development opportunities around Oxford's central railway station, and other possible stations on existing railway lines, but differences between the stakeholders need to be reconciled before quality development can be secured. Little progress can be made without improving the structure and process for planning and delivering major developments. Oxford needs to exploit its strengths, and to assess opportunities against multiple objectives or principles, rather than the interests of any single stakeholder.

2. Upgrading Connectivity

Successful cities are invariably well-connected. URBED's winning submission for the 2014 Wolfson Economics Prize tested out the application of garden city principles to the growth of Oxford. The essence of Ebenezer Howard's original proposals for garden cities was to combine the best of living in both the town and country, and to fund infrastructure through the uplift in land values. Oxford's population is currently growing at 2.4% a year, a rate which was endorsed in the Inspector's report on the City's Local Plan. The Uxcester Garden City report argued that the population could be doubled in 30 years through sustainable urban extensions on the fringes of the built up area rather than in the countryside.[1] (**Exhibit 8**) This involved taking a small bite out of the green belt (around 5%) rather than nibbling at the edges, and offered many environmental and social benefits.
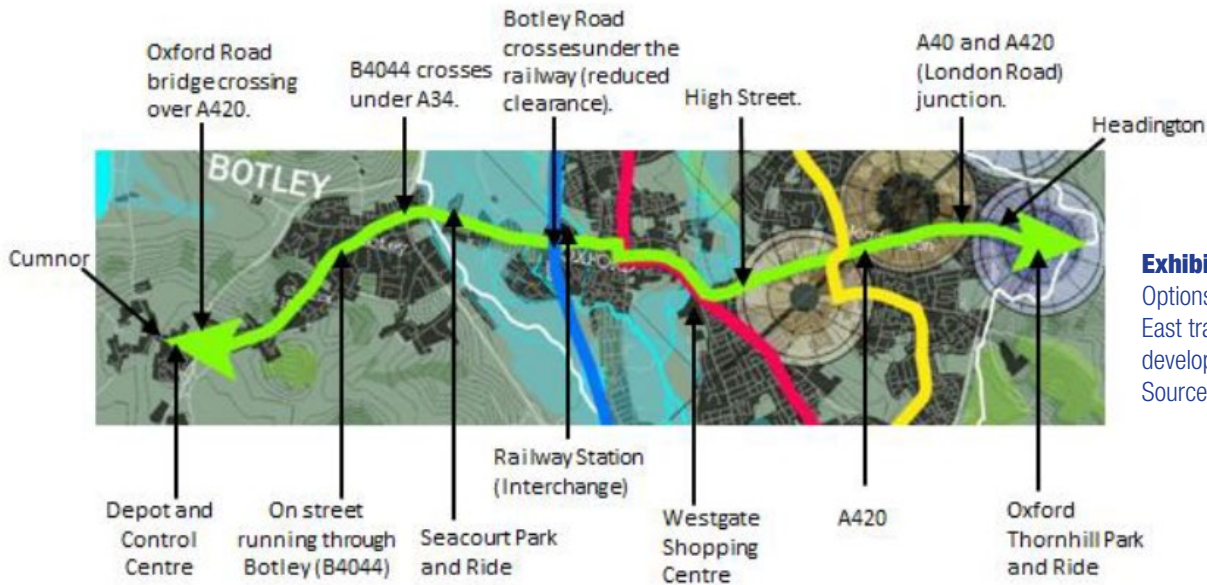
1. David Rudlin and Nicholas Falk, Uxcester Garden City, www. urbed.coop

Exhibit 8:
Oxford should grow through planned urban extensions on public transport
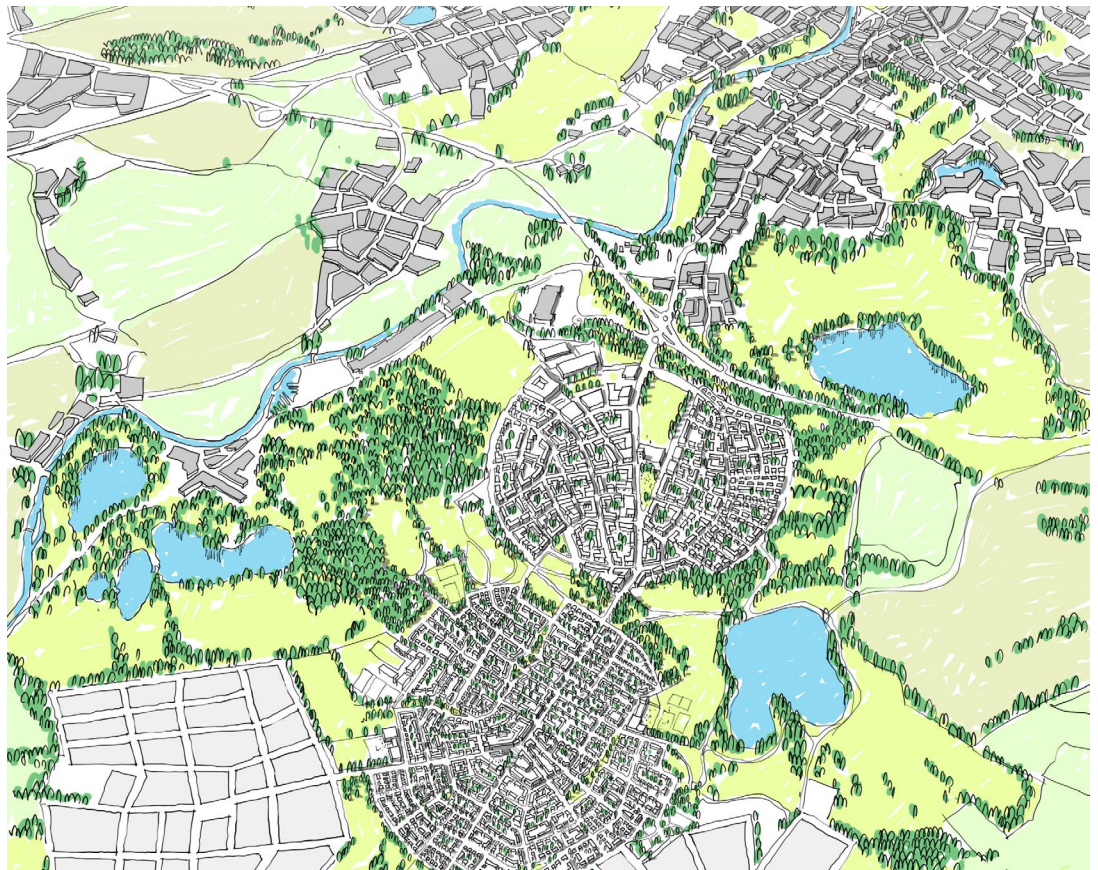
Exhibit 9:
Options for a West to East tram line could be developed in stages - Source Mott MacDonald

Option 1				Cumnor to Thornhill Park and Ride		
Item	Rate (High) £k	Rate (Mid) £k	Rate (Low) £k	Cost (High) £k	Cost (Mid) £k	Cost (Low) £k
Cost (based on cost information from UK LRT schemes)	£30,665	£17,525	£7,120	£377,180	£215,558	£87,576
BRT Comparison	£16,167		£4,985	£198,853		£61,320
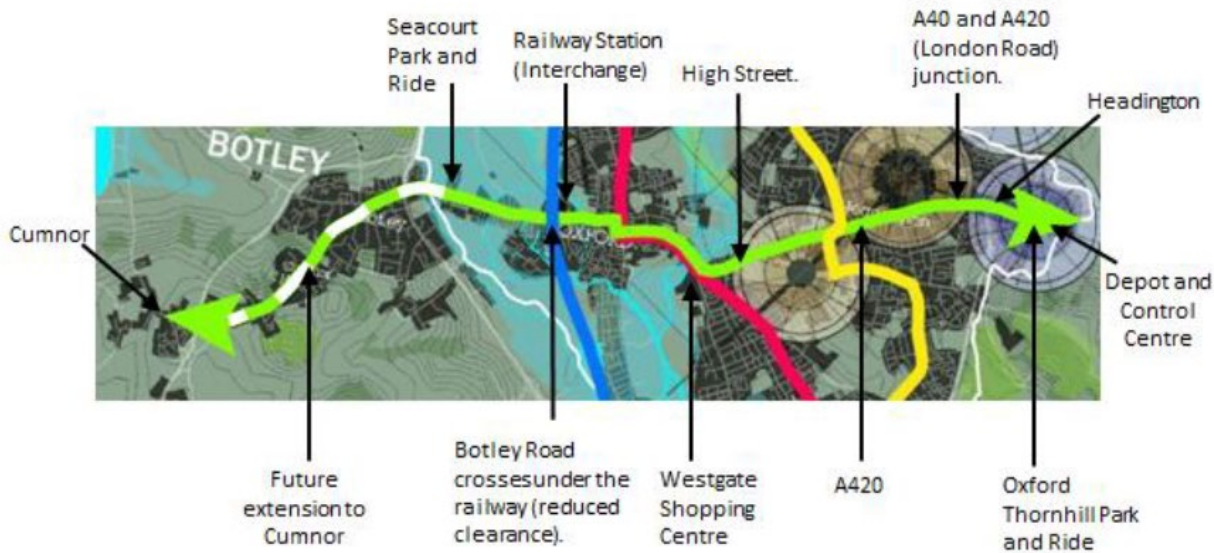
Option 2				Seacourt Park and Ride to Thornhill Park and Ride		
Item	Rate (High) £k	Rate (Mid) £k	Rate (Low) £k	Cost (High) £k	Cost (Mid) £k	Cost (Low) £k
Cost (based on cost information from UK LRT schemes	£30,665	£17,525	£7,120	£251,453	£143,705	£58,384
BRT Comparison	£16,167		£4,985	£132,569		£40,880

A new tram line to take traffic out of the city centre was costed, using figures from Nottingham's experience. This along with other social and environmental improvements could have been funded out of the uplift in land values, provided most was ploughed back. This still allowed for landowners receiving ten times existing use value but not a hundred times!. Trams would transform the city centre, as modern trams are more reliable, quieter and pollution free than buses, and compatible with both cycling and walking. The most cost-effective route would probably be a link between the Seacourt Park & Ride, the central station, shopping centre, universities, and hospitals, and is relatively short. (Exhibit 9)

Since 2014 despite a lot of studies and discussion, there is no agreed spatial development framework that investors can work with, and the feasibility studies to assess options have not yet been commissioned. The situation is now vastly worse because of both the fallout from the Covid-19 crisis, which has upset all planning assumptions, and the likely consequence of Brexit, which could strike at the city's economic foundations. There is consequently a strong case for rethinking transport projects in terms of how to boost the city (and Britain's) recovery, as well as how to offer a model to other cities faced with similar challenges and choices. Creating a truly ConnectedCity depends on a menu of projects that can be implemented incrementally, and that can build trust and confidence during the process rather than one big and iconic project that can take decades before it is operational.

a. Joining-up transport and development

The starting point is a vision, such as that devised by URBED with four main elements, which was subsequently named The Oxford Metro as it would integrate the different modes in a system that was competitive with the private car. (Exhibit 10). The first

element needs to be relatively low cost and high impact, and so made use of existing under-used capacity on the branch line to Cowley in what we have called the Spine Line. Its main benefit would be improving access to jobs along the Science Spine down to Harwell[2]. This was intended to test the feasibility of SwiftRail proposals and was a relatively cost-effective way of advancing the idea of new Garden Cities. The elements of the Spine Line were set out in a diagram prepared by local transport planner Peter Headicar. (see Exhibit 4)

The publication of a preliminary report from the (Oxfordshire Rail Corridor Study) ORCS setting out a longer term framework, along with initial thinking on the spatial growth plan (OxPlan 2050) is an important contribution. It provides the stimulus to think hard and imaginatively about what can be done to accelerate change, and how rail and housing can best be linked. Unfortunately it requires a scale of investment from the government in the order of billions of pounds at a time when hundreds of other projects will be clamouring for funds.

The original Spine Line proposal envisaged extension of Marylebone/Bicester services to Oxford and across the city to a reopened Cowley Branch, and for extension of the shuttle service between Didcot and Oxford (with a passing loop at Culham) to new stations on the Cherwell Valley line at Begbroke and North Kidlington for Oxford Airport. The former is included in the Oxfordshire Rail Corridor Study (ORCS) service pattern recommended for 2028 but the latter is replaced by extension over the North Cotswold line to the existing station at Hanborough to serve Witney instead; Eynsham, with its good bus services to Oxford, is the same distance.[3]

2. The Oxfordshire Innovation Engine- realising the growth potential, SQW, 2013

3. Supplementary papers for the Oxfordshire Growth Board meeting January 28 2020

The ORCS anticipates new stations on the Cowley branch at Oxford Science Park and Oxford Business Park in connection with further local development. It also acknowledges the desirability of new stations in connection with development at Begbroke and Grove (on the lines towards Banbury and Swindon respectively) although their implications for rail operations and possible associated investment requirements remain to be investigated.[4] The Spine Line proposals for new stations on the same lines at the major employment centres around North Kidlington and Milton Park on the line to Swindon are not acknowledged in ORCS.

The Spine Line proposals for new stations on the same lines at the major employment centres around North Kidlington and Milton Park on the line to Swindon are not acknowledged in ORCS.

Most of the service enhancements envisaged are dependent on the rebuilding of Oxford Station with extra platforms, and the provision of additional track for all or part of the route between Oxford and Didcot, a distance of ten miles by rail, fifteen miles by road. Although these are recommended by ORCS as the priority for investment they are not 'quick wins' nor can they be introduced incrementally according to the summary for the Oxfordshire Growth Board. The overall strategy for improving local rail would therefore be undermined if in fact forecasts for increased rail use generally (on which the investment case depends) are downgraded and/or if the Rail Network Enhancements Pipeline funding is cut back, or if a modal switch from road to rail was not achieved (which requires frequent and reliable services).

By contrast the idea of a Metro could be introduced simply through a travel card, like

the London Oyster, that was acceptable on all local rail and road services, with concessions to boost usage. Earlier proposals for an Oxford Metro were based on lessons from Oxford's twin city Grenoble, and experience in Nottingham shows how a tram line can be made to work successfully in an English city.[5] (Exhibit 10) However the original business case for building a new light rail line in the Uxcester Garden City report depended on taking land out of the Greenbelt around Oxford City.[6] IIf that is not acceptable to government, fresh thinking is needed to link transport improvements to potential and likely development around transport hubs and so create much greater value.

The key to securing the sustainable growth of Oxford (and mid-sized cities like it) lies in first making the most of land around the main central railway station, which is largely owned by Oxford University and some of the colleges, and upgrading local services. It would then be possible to develop housing intensively around stations on connected lines and defer having to extend the city's boundaries. (www.connectedcities.org) The critical breakthrough will be making

5. Trams for Oxford, URBED with UCL, 2014, www.oxfordfutures.org

6. David Rudlin and Nicholas Falk, Uxcester Garden City, www.urbed.coop , 2015

Exhibit 10:
The Nottingham tram shows how a tram adds value
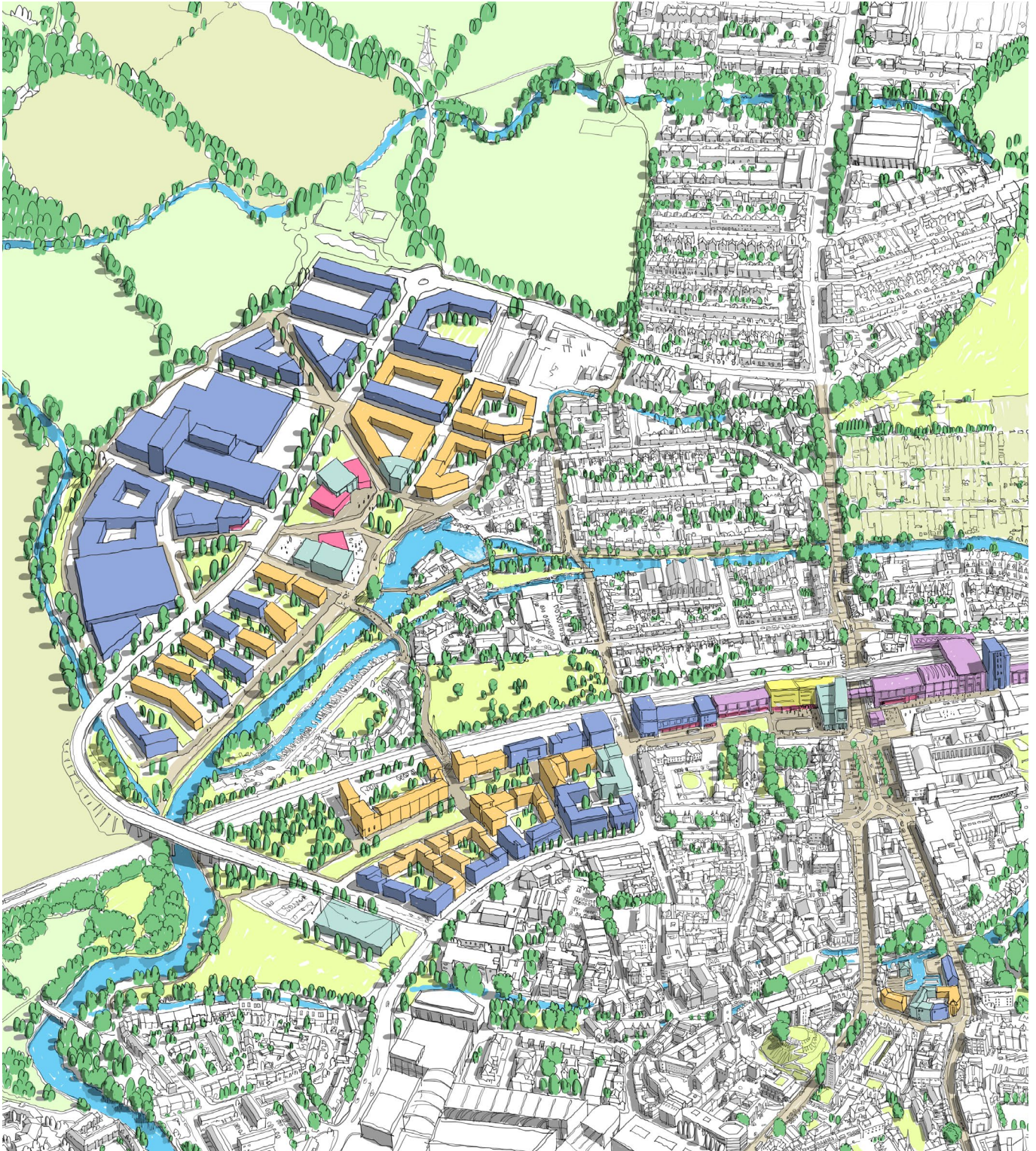
Exhibit 11
Oxford Central West offers space for 'smarter' development. New development shown by the coloured blocks and with new bridge over the river and railway.

planning permissions dependent on both the stage reached in upgrading connectivity, and the contribution to funding necessary infrastructure. In other words control over investment should be used to coordinate the phasing of development, as in other major European countries, as case studies of French, Dutch and German cities have revealed.[7]

b. Maximising the value of Oxford Central

Though the main railway station in Oxford is on the edge of the historic city, it could be the catalyst for the next stage in the city's development, rather like the railway lands at Kings Cross in London or Bristol's Temple Quarter, as the city grows towards the West. (Exhibit 11) Fortuitously, most of the area is owned by a handful of landowners with interests in long-term public wellbeing. Hence it should be easier and faster to reach agreement on the overall development framework, that is the uses and densities that are to be promoted, and contributions to the public good, such as social and affordable housing or open space, with the right delivery mechanism.

A series of workshops were held over the last five years under the title Oxfordshire Futures, and the reports made available on a dedicated web site set up by the Oxford Civic Society - www.oxfordfuture.org. One of the first was held at UCL and involved key researchers on the Sintropher tram-train research programme, led latterly by Robin Hickman who had previously worked in Oxford.[8] Research into the best way of evaluating transport projects found that there was no right way, but rather projects needed to be assessed in terms of their context, (so that a historic city would be treated differently, for example). In an important
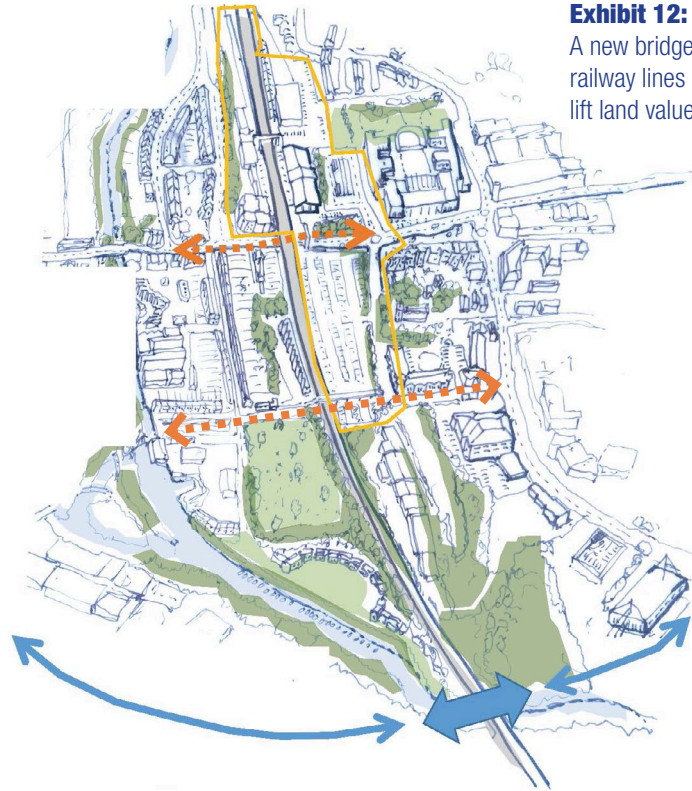
Exhibit 12:
A new bridge across the railway lines and river will lift land values

chapter on the economic and financial dimension, the authors concluded:

Transport investments can be catalysts in generating long-term transformative effects, but these are not guaranteed. Tram-based schemes should be accompanied by a complementary package of measures in order to effectively capitalise on the territorial development opportunities. These could include traffic demand management measures, restrictions on car parking, attractive fare schemes, well-located and good quality station interchanges, frequent reliable services, and good passenger information – as part of an integrated transport strategy. Complementary measures can include urban development initiatives, such as priority economic development sites, housing developments, urban regeneration schemes, and skills training for the local population to access jobs using the enhanced accessibility.[9]

7. Nicholas Falk, Land for Housing, www.urbedtrust.com 2019

8. A Tramway for Oxford? URBED with UCL, 2015?

9. Robin Hickman et al, Sintropher Summary report, 2017

More consideration is therefore required
on how local connectivity can be improved,
not just longer trips, and on how transport
interchanges can be upgraded, which was
the subject of a charrette organised by
the Academy of Urbanism in 2017[10] The
charrette, or action planning event, on
Oxford Central West was organised with
the Academy of Urbanism on behalf of
Oxfordshire Futures. It brought together
transport, planning, urban designers, and
other professional experts for a day to come
up with a possible solution to the problems of
improving access and upgrading the station.
The report of the event focussed attention
on how undeveloped land on both sides of
the railway line around the main railway
station can best be developed. (Exhibit 12)
Unlike Cambridge, where the area around
the station has been largely redeveloped and

transport upgraded, the existing station has
no heritage value and offers an extremely
poor gateway to a world-class historic city.

URBED calculated that the area known as
Oxford Central West contains some 200
acres of under-used land, with most of Osney
Mead owned by the University. Part lies
in the flood plain (though not necessarily
subject to flooding). The former railway land
at Oxpens is now largely owned by the City
Council with Nuffield College, who own the
land through to the centre on a long-term
lease from Christ Church. There is little
proven development value, and though the
new Westgate Shopping Centre represents
a major investment, the whole area feels
isolated from the heart of Oxford. However,
once access is improved over or under the
railway line there would be 'marriage value'
in bringing the different sites together.
Indeed, if a new hotel is developed alongside
the Said Business School, the city's role as a

10. Oxford Central West: a new city quarter, Academy of
Urbanism, 2017

major international conference centre would be further developed, helping to reinforce and diversify the city's economic base.

To be successful the development of Oxford Central West requires at least one bridge over the river and railway line, which would impact on current plans for the adjoining land. Such a bridge is likely to be essential if work is ever to be undertaken on upgrading the Botley Road railway bridge. It also may well be vital to attracting investment into Osney Mead as it would provide an emergency diversion route for public service vehicles. There was agreement on the best location for crossing the river and railway line, and on developing the station for far more than just a transport hub, drawing lessons from recent Continental stations such as Rotterdam and Utrecht or from the university cities of Grenoble and Freiburg. (Exhibit 13) While it will undoubtedly be controversial given Oxford's traditional response to bold proposals the benefits from greater intensification around the main station could win over critics.

In the Academy of Urbanism's charrette on Oxford Central West separate teams came up with remarkably similar ideas for what should be done with the site, but with options. For example if a transit line were developed through Osney Mead, traffic could be taken out of the road running past the station, which could then be released for a future rapid transit link to a park and ride site on the nearby ring road at Botley, which could then remove the tourist buses that tend to dominate the centre. A scoping study by the engineering experts on tramways Mott McDonald suggested a tram line would be viable and showed that the costs were less than other rail schemes that are being promoted. (see Exhibit 9)

The 'Green' Line on the illustrative diagram might be split into several phases, with the first stage connecting Botley with Oxford Station and the Westgate Shopping Centre, which adjoins the historic city centre,

and combined with the rebuilding of Botley Road Bridge, which in turn allows the station to be used more intensively. An important conclusion is that any development proposals need to allow for a major potential interchange and transport hub at the heart of the UK's transport system and reinforce what they will provide. Exhibit 14 gives an indication of opportunities around Oxford central station that can be considered as part of an integrated vision for development of the Innovation Quarter area. These opportunities include:

- Innovation Hub integrated with new Transport Hub allowing for better connection with buses and the proposed tram.

- Better pedestrian and cycle routes in the area allowing better connection with the river, canal and Osney Mead.

- Biodiverse 'green fingers' that connect existing green spaces with new Green Infrastructure, such as Green Bridges and Biosolar green roofs (Bioslar Roofs are where solar panels are integrated into a green roof to cool the photovoltaic panels and hence allow them to generate electricity more efficiently).

- A green bridge at Osney Lane could replace the existing footbridge over the railway, the existing bridge is in poor condition.

Fereday Pollard have developed a study showing how development of the train station could occur incrementally, with the first phase primarily being in the car park to the south of Botley Road. A key advantage of this incremental phased approach is that it allows for train services to continue with minimal disruption whilst the existing station and the Botley Road bridge are redeveloped. This is described in more detail in Appendix C.

As with all railway junctions, better rail

Botley Road

Osney Cemetery

Osney Mead

Westgate Shopping Centre

Key:

- - - - - → Possible tram links

- - - - - → Opportunities for enhanced cyclist / pedestrian connectivity along watercourses

————→ Opportunities for cyclist / pedestrian connectivity along biodiverse green infrastructure (incl. green bridges & green roofs)

◯ ▢ Opportunities for new interchange with regional / subregional connections

◯ Opportunity areas for improved pedestrian experience & local connections

Exhibit 14:
Connectivity around Oxford central station should be improved. Diagram drawn by Fereday Pollard for the URBED Trust

services must be integrated with bus and taxi services, as well as adequate parking for bikes and space for cars to meet trains, and associated services such as place to 'meet and greet' and obtain refreshments. A modern transport hub on the South side of the Botley Road would not just serve long distance trips to London, the airports, and provincial cities such as Cheltenham/ Gloucester. It would also encourage a switch to rail for journeys that are longer than a bike ride from the surrounding residential neighbourhoods, and that otherwise would involve an unpredictable car or bus journey. Hence the rebuilt station at Oxford Central would provide visitors as well as residents with a vision of what a 'smarter' future could be like, as well as social, environmental, and economic spin-offs. Such a station could be integrated with commercial development, as in Grenoble and Utrecht, to pay for the costs of the building.

A very rough calculation of the cost of opening up new stations along the line from Cowley (currently freight only) to Kidlington to the North of Oxford, and also improving the train service to Culham and Didcot suggests funding in the order of £60 million would be required to trigger investment of say £20 million from the Department for Transport.(see Appendix A) This compares with estimates taken from the rail corridor study of £29-38 million for a basic level of provision, £35-53 million with potential enhancements, but not including land for stations on the Cowley branch. However, ORCS states that nothing could be opened before 2028, whereas our proposals are aimed at achieving much earlier improvements.

Because there are opportunities to develop the land alongside new stations, for example at Begbroke Hill as well as at Magdalen Science Park and to serve the disadvantaged Council estates of Blackbird Leys, much of the costs might be recovered from land value uplift, assuming some flexibility in both the mix of tenures and the phasing. Indeed this could provide an important test case for the

introduction of development charges and possibly some form of 'wealth tax' to help rebalance Britain.[11] House prices in South and East Oxford are likely to rise further once the deficiencies in terms of amenity and connectivity are removed. The estimates in Appendix A suggest that most of the costs could be recovered from a charge on development such as the Infrastructure Levy proposed in the Future of Planning White Paper, and even more if the public sector were able to acquire the land at close to its Existing Use Value (EUV).

A range of other possible development sites for housing need to be considered, where in each case both the density of development and the proportion of affordable or social housing will vary. Locations include Magdalen Science Park, Kassam Stadium/ Bowlplex, Blackbird Leys, Oxford Business Centre, and the various hospitals around Headington, which would all benefit from the new tram or light rail line proposed in our plan for the full Oxford Metro, which is also supported in the City Council's Local Plan. What is needed next is a full feasibility study that can bring engineering and economic considerations together.

c. Accounting for multiple objectives

As there is no longer public funding available to implement the original electrification proposals, let alone rebuild the station, the position in Oxford is currently 'stalemate'. The scale of investment and risks are too great for any conventional private developer to take on, made worse by the fractured political situation. For example, the construction costs could be much higher than anticipated because of the engineering problems of deepening or widening the Botley Road under the railway bridge and next to a river, which would be compounded

11. Nicholas Falk, Sharing the Uplift from Land Values: a fairer system for funding and delivering housing growth, TCPA Tomorrow Series Paper 20, 2019

so long as the station is still operational. Yet once the bridge is upgraded it should be possible to improve access from all sides. Hence a strategic spatial plan or development framework is required urgently that considers the main development options and possible funding sources so that investment can be properly phased and integrated. Public private partnerships will also be essential, following a thorough feasibility study of development options.

By applying 'sensitivity analysis' as the Treasury, NIC and DCLG all want to see, a more refined analysis of the capital and running costs of the alternatives would lead to much better overall value for money, taking account of land value uplift in the process.[12] It also can be used to 'future proof' the project by taking account of the likely shape or distribution of both jobs and residences at different stages, for example at ten-yearly intervals up to 2050. Such an approach is essential to drawing up an overall spatial and investment plan, as account can then be taken of a range of possible scenarios rather than assuming current trends will continue. For example, after the Covid-19 epidemic many more people are going to be working from home part of the time, and so the demand on existing rail and other transport services will drop. Concerns about pollution, which has a major impact on public health, may lead to further restrictions on car use in city centres.

One of the obstacles to taking an innovative approach like this is the way transport projects are assessed in the UK, through a process known as WebTAG, standing for Transport Analysis Guidance. The failings of this process have been examined in a series of workshops run through the ConnectedCities network. www.connectedcities.org. Professor David Metz, who formerly worked for the Department for Transport, has pointed out the limitations of focussing on time saving when many people

choose to spend the same amount of time but simply travel further after improvements have been made, thus adding to CO2 emissions. Insufficient attention is paid to the impact on public health, for example through air pollution, and on wellbeing or on the importance of changing travel behaviour to deal with climate change, as groups like Friends of the Earth have argued in a vision for the future of Oxfordshire.[13] The spatial distribution of benefits is not considered at all by the conventional approach.

In WebTAG all the costs are divided into the benefits to create a Benefit Cost Ratio, which is then compared with all the other transport projects looking for funding. The results invariably favour road transport, over projects with wider benefits such as light rail, as they stress time savings. They fail to consider the impact on property or business investment, and the wider benefits of upgrading historic centres, such as improving conditions for visitors or attracting private investment. They also do not consider the scope for making savings in the costings of rail and road schemes.

Alternative systems as set out in the Treasury's *Green Book* or the MHCLG *Guide to Project Appraisal* or the National Infrastructure Commission's report on the needs of the Midlands would produce quite different results. Instead of the limited benefits of faster travel, which form the foundation of Cost Benefit Analysis (CBA) studies, there is a strong case for commissioning Multiple Criteria Analysis (MCA) that would assess all the benefits (as was done, for example, in preparing the original Structure Plan for the growth of Cambridge). This, of course, requires a dynamic model that can consider development and transport together over different time periods, and that differentiates between rail and road capacity (unlike the recently published Mistral report on sustainable futures

12. DCLG The DCLG Appraisal Guide, December 2016

13. Fast Forward Oxfordshire, www.oxfoe.co.uk

for the Oxford to Cambridge Arc, which formed part of a national study which unfortunately treated rail and road alike.[14])

The criteria or principal objectives should form the basis for further consultation before further planning studies were undertaken. The example of the Cambridgeshire Quality Charter for Growth shows how consultation and drawing lessons from what works can help in raising quality standards and building consensus.[15] In the case of the growth of Oxford, a historic university city where housing is generally unaffordable and social disparities great, agreement is needed on the objectives, principles or criteria before different scenarios are assessed. Drawing on the results of earlier consultations the policy objectives might start with goals or criteria such as:

a. Reducing the shortage of affordable and social housing so that existing residents can find the housing they need to lead better lives

b. Enabling employers in key sectors, such as the universities and start-up SME's to attract the staff they need

c. Reducing congestion, and improving air quality in the historic centre by cutting pollution of all kinds

d. Making the most of existing infrastructure and providing stations where there is the potential ridership.

An example of how a development project can be designed to meet multiple criteria is the redevelopment of the bus station in San Francisco as a multi-modal transit hub. The roof has been turned into a two acre park, which not only provides a valuable open space in the heart of the city, but also greatly

14. ITRC Mistral Infrastructure analysis: OxCam Arc, 2019
15. Cambridgeshire Quality Charter for Growth, www.urbed.coop

Exhibit 15:
The Salesforce Park on top of the new San Francisco Transit Hub

enhances the views, and hence the values, of the new apartment towers and office blocks that have been developed around Salesforce Park. This is named after one of the largest employers in the digital economy and provides an image of the kinds of places with which Oxford will be competing. (**Exhibit 15**) but housing costs in San Francisco are very high.

d. Achieving early results

So many of the projects under consideration have such long development periods that it will be hard to retain local support or convince investors that Oxford is changing for the better. Hence an investment programme is needed to link improvements to development. So, in some situations, such as along the route of the A40 West of Oxford where the population is very dispersed it will prove more economic, both in capital terms but also in terms of outcomes, to improve the

Exhibit 16:
Grenoble Station has become a prime business location

roads. Repairing the surfaces and eliminating potholes is an obvious example that makes it easier to use a bike but also will be appreciated by car owners. Cyclists require their own paths separated from other traffic, especially in the country with higher traffic speeds

One option under consideration is the interest being shown in developing Hanborough as West Oxford Parkway on what is termed the Cotswold Line, which runs to Worcester. The station is several miles away from the 'self-contained' Garden Village proposed for Eynsham, and near a planned park and ride facility.   As with the original 'hamburger' roundabouts that Oxford pioneered, ways must be found to speed traffic through intersections while still allowing pedestrians or cyclists to move safely, which requires innovative solutions. In the next phase of work on transport options it is important that the potential for upgrading or reinstating stations is considered in the light of the likely amount and value of housing that could be developed alongside. (see Appendix A)

Priority should also be given to Quality Bus Corridors, or what is sometimes called Bus Rapid Transit (BRT),to avoid disrupting the calm of residents through major new roads who have been attracted by living in a rural area close to Oxford or London. However, where the geophysical conditions limit the opportunities, and there are lots of residents, other considerations should take priority. Kidlington just North of Oxford, and at one end of the Science Spine already has a large population of over 20,000 living close to the rail corridor and housing values are high enough to support many more. In this case there are huge environmental benefits in terms of pollution and health in achieving a modal shift, including more use of cycling and park and ride, which will be essential in responding to a declared Climate Emergency. The difficulties and risks are relatively straightforward to overcome.

Rail comes into its own where densities are relatively high and where it is essential to secure a modal shift away from cars, such as in historic cities, and where air quality needs to be improved. With many employers

complaining about attracting good staff, there would also be correspondingly more economic benefits to improve access to the major employment centres at Milton Park and Harwell, near Didcot. Quite small investments would make it possible for trains to pass each other at a central point like Culham, one of the science centres, where the station, along with Radley, may also serve neighbouring Abingdon. This could defer the need for much larger investments in four tracking without sacrificing the main benefits.

Major housing development can be promoted early on South of Grenoble Road, because its location lends itself to providing a significant amount of 'affordable' housing near a new station on the reopened branch line to Cowley. Land alongside the central railway station could then be developed for higher value uses such as for private offices and research centres, or university backed facilities, serving an international market, rather than just for affordable or student housing, important as those are. The right design will support better facilities in and around the station itself, such as a modern transport hub, as the example of Grenoble, Oxford's twin city, illustrates, and there are many other European models to draw on. (**Exhibit 16**)

An exceptional British example is Broadgate, which enabled the development of Liverpool Street Station to go ahead. Inspiration can also be drawn from cities such as Worcester where a Parkway station has recently been opened as an interchange with the line to Birmingham and Gloucester, triggering proposals for 10,000 homes. Another relevant example is Reading, where an attempt has been made to locate facilities on the bridge over the line as in Amersfoort in the Netherlands, thus enabling land alongside to be developed at higher densities. The much-acclaimed development North of Kings Cross Station in London forms one of the case studies in a World Bank book on tapping land value uplift, which can be readily downloaded.

To achieve the full potential of what in the USA is called Transit-Oriented Development (TOD), a way must be found to 'pool the land'. Such a policy was suggested in a previous government's Housing White Paper Fixing our Broken Housing Market, and is commonplace in Germany. It would require a mechanism such as a development corporation, and significantly four were proposed for Cambridgeshire in the new government's first budget in March 2020. A brief is needed to set out the development framework - that is the basic conditions for development such as permitted uses, plot ratios, and proportions of land to be given over to open space and social housing. Some of the costs could be funded through some form of Community Infrastructure Levy on developments that would benefit. However it would be far better to borrow the funds to install the infrastructure through a bond, and then repay the interest from disposals, with a further charge on each unit that is occupied, as proposed in Nicholas Falk's TCPA pamphlet.[16]

Conclusion

A rapidly growing city such as Oxford will greatly benefit from an integrated transit system, which may be essential to overcoming objections. This needs to be phased so development and infrastructure can be joined up. The idea of making the first phase the introduction of frequent services along the Science Spine that runs from Kidlington/Hanborough and beyond to Didcot and Harwell has many appeals, because of the scope for development adjoining existing or new stations. The bottleneck of Oxford Station holds the key. It needs to be developed as a mixed-use high-density business quarter as well as a transport hub to get best value from the land around

16. Sharing Land Value Uplift, TCPA Tomorrow Source Paper 20 and TCP August 2020

3. Packaging Finance

the station, which depends on joining both sides of the line together.

The key to making complex projects of this kind viable is to break the work down into incremental steps that can be phased and draw on almost every available source of funding as development proceeds. This requires an understanding of all possible sources, a way of sharing in the uplift in land values once agreement has been secured and the initial uncertainties resolved, and a means of evaluating the returns against the wider objectives. These need to go beyond conventional transport considerations such as travel time saved so that some early wins can be secured that offer best value to the local community. Some corners may need to be cut if we are to get ahead in these difficult and uncertain times, for example, by refining the Oxford Green Belt.

a. Tapping all the sources

Little consideration seems to have been given yet to tapping private finance. Planning in a 'growth area' such as Oxford needs to take account of the potential uplift in land values associated with infrastructure improvements. Growth Areas or zones could be defined as areas with property values in the top fifth or where population is growing much faster than average for the county or region. Private developers are attracted to growth areas, and would take account of the 'marriage value' of combining land on both sides of railway tracks, and so too should the community through what we have called Land Assembly Zones in a report for the Greater London

Authority.[1] Assembling land should be easier around Oxford's central railway station as Oxpens, is owned by the City Council and Nuffield College under a long lease from Christ Church, while in Osney Mead on the West side of the railway line, the majority of the freehold is owned by the University of Oxford. What if land value uplift and relative costs were the determining factors, rather than where communities are most vocal, applying what the National Infrastructure Commission has suggested and the Treasury seems to favour? A circle might then be squared, and a 'deal' presented to investors that they would find attractive.

In the draft report Oxfordshire Futures 2050, a chapter was devoted to reviewing all the potential funding sources that could be tapped. Apart from radical new forms of taxation (for example on carbon emissions) or higher fares the most relevant sources for Oxford comprise:

- Crowd funding
- Congestion and parking charges
- Community Infrastructure Levy (CIL) and Section 106 charges
- Infrastructure bonds
- Tax Increment Finance (TIF)
- Land value charges
- Land assembly deals
- Public private partnerships

1. URBED with Dentons and Gerald Eve, Capital Gains: a better land assembly model for London, www.london.gov.uk,2018
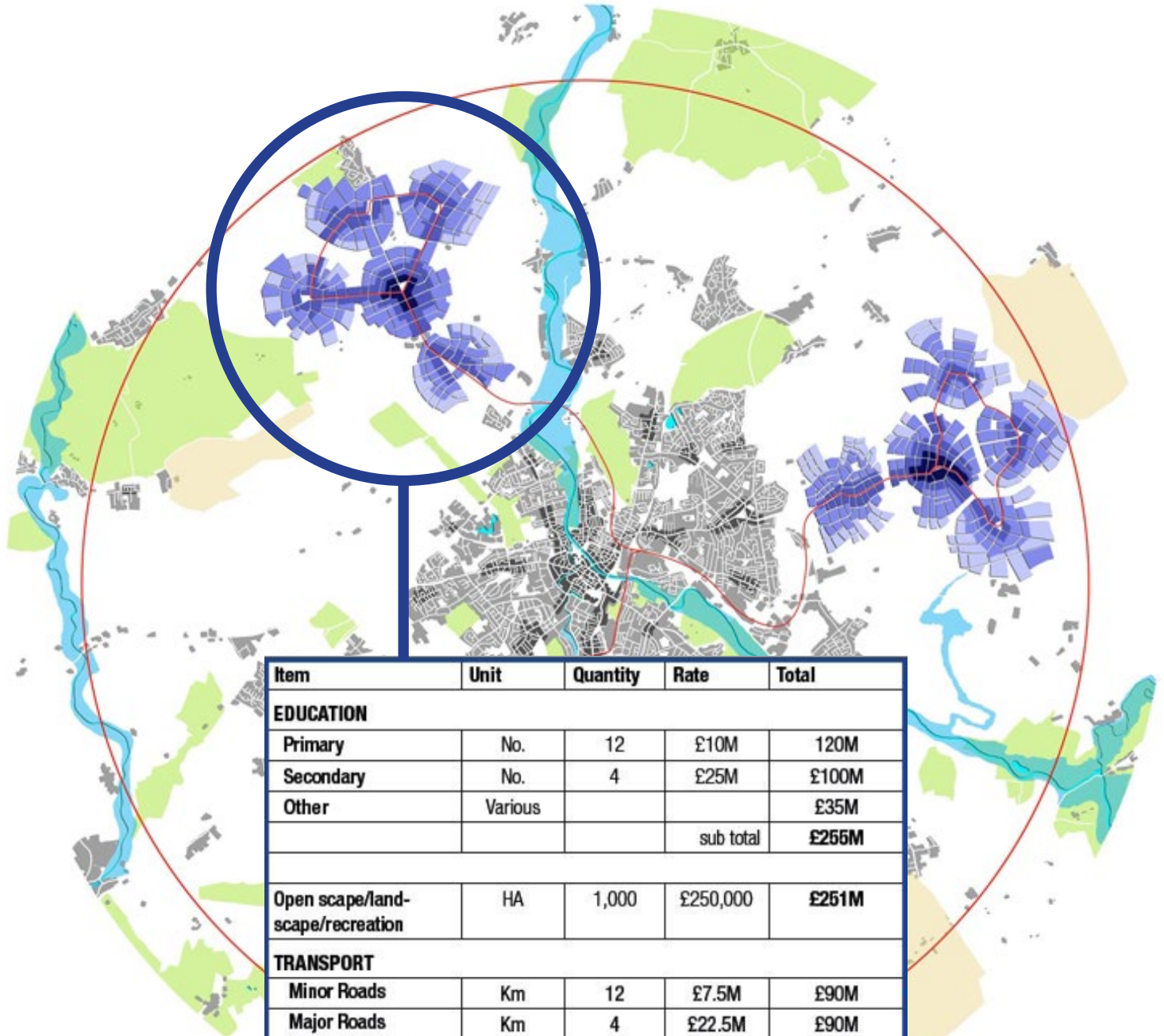
Item	Unit	Quantity	Rate	Total
EDUCATION				
Primary	No.	12	£10M	120M
Secondary	No.	4	£25M	£100M
Other	Various			£35M
			sub total	**£255M**
Open scape/land-scape/recreation	HA	1,000	£250,000	**£251M**
TRANSPORT				
Minor Roads	Km	12	£7.5M	£90M
Major Roads	Km	4	£22.5M	£90M
Tram to city centre	Km	6	£20M	£120M
Tram within N'hood	Km	6	£10M	£60M
Other Public tran	Various			£50M
				£410M
HEALTH				
Primary	No.	5	**8**	£40M
Hospices/nursing homes	Part	2	**10**	£20M
				£60M
Land preparation	HA	2,000	£50,000	**£101M**
Distinctive Quality	Various			**£100M**
Admin / marketing	**Years**	15	£3M	**£45M**
Contingency				**£100M**
			TOTAL	**£1,372M**

Exhibit 17:
The infrastructure budget for Uxcester Garden City from URBED's Wolfson Prize-winning essay.

There are also other models used in France, such as the Versement Transport, which is a charge on the payrolls or enterprises employing more than ten which is dedicated to local transport improvements or subsidising fares, but this would require legislation, and so has not been considered. This could form part of a new "green" agenda given the large contribution of transport to climate change.

Oxford, with its exceptional universities and pressures, along with other historic cities that draw tourists, is one of the least affordable cities in the UK, which makes it one of the best places for tapping land value uplift. Oxford requires a huge level of investment if proposals for doubling the rate of house building are to be implemented, and the transport system upgraded to cope. In the foreseeable future, public funding is only likely to be available if the business case is matched by private investment and the projects can produce some short-term benefits. It will also help if the new housing is both affordable and climate-proofed, which requires them to be within about 10km of the city centre on land that does not flood, as URBED's proposals for Uxcester Garden City illustrated. (**Exhibit 17**)

With pressure to reduce greenhouse gases, restricting residential parking could well become a precondition for securing full planning permission close to public transport corridors, perhaps through Design Codes along with measures such a Congestion Charge or Workplace Parking Levy to engage with major employers. As with investment in London Docklands back in the 1970's under an earlier Conservative government, there will be most interest in projects that 'leverage' private investment, that involve a 'cocktail' of funding, and that can deliver early results.

The area around Oxford Station offers a great test case of such an approach as the benefits would be considerable, and there is considerable scope for improving

connectivity by foot and bike as well as othe modes. (**Exhibit 18**) Quality mixed use development there would provide Oxford with the commercial space to take pressure off West London and to match competing Continental cities such as Grenoble, Freiburg or even Copenhagen. Much needed affordable housing could also be located where the best conditions for bringing up a family exist and where a social balance can be achieved. The city could gain a new attraction – an 'eco quarter' - and one that would reignite confidence and show what a better future could be like by packaging finance from several sources.

Higher density development to be promoted in areas that either have or are likely to benefit from improved public transport such as n Botley. This could be through a planning policy that supports locations that do not increase car use or carbon emissions, using Section 106 agreements, and that would enable land assembly in transport development areas. Such a policy could also be used to promote the recovery of other mid-sized cities that are grouping together in the Key Cities network, such as Gloucester or Preston. It might therefore be used as part of a policy for rebalancing British cities and responding to proposals such as those of the UK2070 Commission aimed at reducing regional inequalities.[2]

b. Sharing the uplift in land values

While there is always great resistance in the UK to increasing taxes, there is general acceptance among eminent economists that taxes on land or property are the least objectionable.[3] Land accounts for a relatively high proportion of the costs of

2. UK2070 Commission, Make No Little Plans: acting at scale for a fairer and stronger future, 2020 www.uk2070.org.uk

3. See for example Paul Collier, The Future of Capitalism: facing the new anxieties, 2019

housing in the UK, and much of the uplift goes to what economists call 'free riders' who wait for development to happen rather than those who took the risks of investment. The cost of land gets blamed for the housing crisis even by columnists who write for the Daily Telegraph.[4] One approach which therefore needs to be tested further in the UK is Land Value Capture.(LVC) This has been used to fund the very successful Metro system in Portland Oregon as well as the new metro in Copenhagen. LVC is one of the keys to the success of South East Asian city states such as Singapore and Hong Kong.[5]

In the UK sharing in the uplift in land values is the subject of a comprehensive research report published by the Town and Country Planning Association.[6] Furthermore some of the benefits from European tax systems that narrow inequalities may be secured through long overdue changes to the Business Rate and Council Tax. A high level seminar on January 16th 2020 was held at the London School of Economics with Professor Paul Cheshire, who has proposed replacing charges such as Section 106 or the Community Infrastructure Levy with a simple charge on the value of completed housing developments. The seminar concluded on the need to test out both the acceptability and viability of possible approaches in a practical case, such as Oxford, where considerable research had already been done in the past, where wealthy and influential people reside, and where the 'logic of events' call for innovation.

While the likely costs of the infrastructure needed to build new and better housing in Central Oxfordshire will be high, so too potentially is the contribution from the uplift

in land values after development. A good idea of the scale of funding involved comes from a study for the company set up to promote the East West rail link by Tom Aubrey, an expert on land value capture. His figures suggest that the cost of transport infrastructure could be funded through the sale of residential and commercial plots, which would yield almost £600 million in Oxford alone, and save relying on limited government funding. His report argues that:

The prize of investing £14bn along the corridor is substantial, including:

- 150,000 houses to be constructed along the East West corridor doubling housing output, with over a third affordable housing, and without the need to build on green belt land.

- £8bn of transportation infrastructure investment including the East West railway, a new expressway and numerous small scale transportation projects, as well as £1bn of additional investment in green space and utilities. These investments could be funded by up to £22bn of income over the project derived from:

- £9.3bn from the sale of residential and commercial plots with planning permission where the windfall gain in land values flows to local authorities

- £8.6bn in income from social housing

- £4.4bn from business rates supplement, track charges from the new railway and revenue from utilities infrastructure.[7]

There is however a problem of capturing the uplift in land value under the current British planning system. This is because when development approval is granted ALL the land value uplift goes to the landowner or developer (apart from whatever is negotiated

4. Liam Halligan, Home Truths: the UKs chronic housing shortage, Biteback Publishing, 2019

5. Nicholas Falk, Sharing Land Value Uplift: a fairer system for funding and delivering housing growth, TCPA August 2016

6. Nicholas Falk, Sharing the Uplift in Land Values, Tomorrow Series paper 20, Town and Country Planning, August 2019 www.urbedtrust.com

7. Thomas Aubrey, Funding the investment in infrastructure and affordable housing for the East West Corridor, The Centre for Progressive Capitalism, 2017

under Section 106 of the Planning Act). Even if this were to change, they could wait for a reversal of policy as there is little or no 'holding cost' for sitting on land. Consequently, a range of think tanks and individuals have put forward proposals for change, which may now be on the political agenda now the planning system is to be reformed, such as an Infrastructure Levy on the value of new homes when they are completed.

Interest is growing in the kinds of methods used to build the English New Towns after the Second World War not only to fix a 'broken' or unresponsive housing market but also to speed up land assembly and make housing more affordable, as a recent book by a Daily Telegraph writer argues.[8] n the last budget four development corporations were announced for around Cambridge, which would have the power to assemble land at close to Existing Use Value. The Mayor for the Combined Authority is promoting an ambitious transport plan which includes an underground transit line, with funding from Land Value Capture. Tapping the 'marriage value' from land assembly is not only key to securing a greater share of investment from the private sector but also to building housing on the scale and quality required.[9]

A fundamental element in Ebenezer Howard's original proposals for what he called 'garden cities' was the funding of the infrastructure needed for new settlements out of the uplift in land values from development. New settlements could then be built that combined the advantages of both town and country without their limitations. The model of 'garden cities' which won the 2014 Wolfson Economics Prize has generated a lot of support within government and

beyond from people on all political sides.[10] Unfortunately most of the projects that have badged themselves as Garden Settlements have not followed the basic principles, and are attacked for 'green wash'.

In a financial crisis, as demands on government rise while incomes fall, there should be even stronger interest in innovative funding mechanisms that raise more of the costs of public projects from likely beneficiaries. There has also long been a call for a substantial devolution of power to more local levels, for example in the report of the UK2070 Commission, which will require different forms of taxation, especially with regard to property taxes.[11] This will be particularly important in areas most affected by the potential loss of investment after Brexit and the Coronavirus such as our historic university cities. Significantly the OECD is mounting a major international research project into Land Value Taxation. Oxford could well benefit from being considered as a test case, especially with the need to rebuild international links and overcome the uncertainties of Brexit.

c. Securing best value from investment

To achieve the kinds of results set out in this report, an organisation is needed that can act entrepreneurially but in the public interest. Not only does land need to be pooled, starting with land in public ownership, but so too does public funding from different government departments. In the absence of a proper reform of the funding system, some kind of proven mechanism should be used, as Michael Heseltine did when he persuaded Mrs Thatcher as Prime Minister to establish development corporations for London Docklands and Liverpool in particular. This

8. Liam Halligan, Home Truths: The UK' chronic housing shortage, Biteback Publishing 2019

9. Capital Gains: a better land assembly model for London, URBED with Dentons and Gerald Eve for the Greater London Authority, 2018

10. David Rudlin and Nicholas Falk, Uxcester Garden City, www.urbed.coop

11. UK2070 Commission, an inquiry into regional inequalities, Final report, uk2070.org.uk 2020

Physical

Economic

Social

Investment

Economic Success

Quality of Life

Urban Management
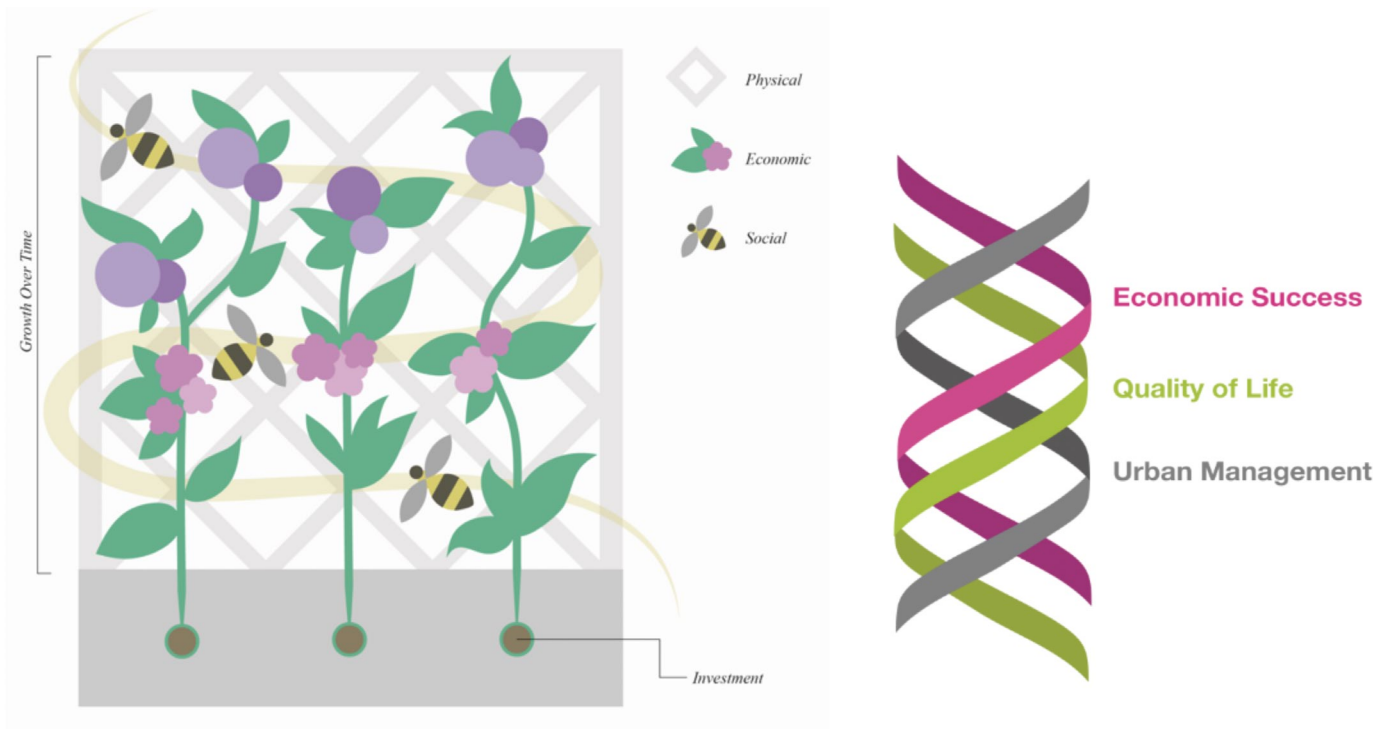
is particularly important in a situation where responsibilities are divided, land ownership is fractured, the public sector is demoralised, and the risks are too great for any private developer or institution to take on.

A common mistake is to think the problem can be solved simply by employing consultants on a large budget, or appointing a high powered (and highly paid) individual. Yet all the lessons from organisations that have changed direction is that success depends on a team, not just one individual, as examples such as Apple and Microsoft clearly show. The problem is even greater in the public sector where there are multiple objectives and innumerable constraints. While popular books such as High Output Management rightly focus on the process and outputs, rather than missions, they are of little help in a situation where there are a number of different organisations that need to collaborate over a long period of time, as in the case of the Oxford Metro.

So rather than creating superior organisations, which invariably are out of touch with the battlefield and alienate all the troops, government needs to think in terms of alliances, with a concordat that sets out the areas for working together. This worked well in the case of Newcastle and Gateshead which had been historic rivals and is far less costly than total reorganisation. To manage or lead the process, it is often effective to set up taskforces, with a remit and deadline to report on what should be done. But to secure the necessary continuity or 'buy-in' a small group may be needed to lead a task force.[12]

By bringing together two or three people with compatible personalities but different skills and supporters, a much stronger organisation can be created. A good model is the Double Helix found in DNA, which is used to explain life itself. This was the model for regenerating the Dutch city of Eindhoven after both Philips and DAF closed their factories, and the City persuaded the adjoining authorities to join forces.[13] The spirals of which a helix is formed also illustrate the process of going round in circles but climbing all the time, rather than flying off at tangents, to use a familiar

Exhibit 18:
Sustainable growth is like a triple helix or the way a vine grows onto a trellis.

12. Robin Hambleton, Leading the Inclusive City: place based innovation for a bounded planet, Policy Press, 2014

13. Nicholas Falk, Resourcing Smarter Housing Growth in the UK, Academy of Urbanism Journal 12, Winter 2018

analogy. (Exhibit 18) Instead of bundling organisations together to do everything, which is a formula for endless uncertainty and consultancy bills, a concordat can be reached over a specific set of tasks, such as making the most of existing transport capacity along a commonly used travel corridor or axis. In this case the trio may comprise a transport expert, someone involved in development finance, and a politician who can command almost everyone's respect (possibly retired).

Such a proposal will encounter objections from all those who do well under the current system or who live in dream worlds. It will be dismissed as premature while major changes are under consideration for both local government structure and the planning system. To reach agreement it will therefore be necessary to hold further consultations, and commission some expert advice (which may be used to show that action is underway and that public funds will not be wasted). The initiative might come from a trusted body such as the National Infrastructure Commission, or one of the main stakeholders such as Oxford University or Oxford City Council, which is in a partnership with Nuffield College. The work on how best to provide affordable housing might even secure backing from a charitable trust, as was the case in funding work on Cambridgeshire Futures as part of the Structure Planning process.

d. Refining Oxford's Green Belt

The greenbelt has become a 'sacred cow' with fierce defenders, and rarely subject to proper scrutiny to assess how well it is performing against all its objectives. In the absence of proactive spatial plans, both developers and house buyers tend to jump boundaries, and pick places that are isolated from public transport but relatively cheap to acquire. In a rural setting, with no requirements to meet either design or affordability standards,

developers can operate with much more certainty, and so greenfield sites tend to get prioritized because they are both easier and more profitable to develop.

The concept of the green belt has been subject to criticisms from both left and right, notably from economist Paul Cheshire at LSE, who has calculated that more land in Surrey is devoted to golf courses than to housing. Liam Halligan, a columnist for the Daily Telegraph produced a powerful book aimed at providing the Conservative Party with a rejoinder to what Labour was expected to go for at the last election. While the Labour Manifesto was packed full of proposals on every imaginable topic, it neglected saying much about land, as it was considered 'too difficult' or contentious. Yet Shaun Spiers, a former director of the CPRE and now Green Alliance has put forward clear proposals in a book which could secure support in areas where development land is very scarce and new ways of paying for affordable homes are needed.[14]

The green belt boundaries can only be revised as part of the statutory planning system, and Local Plan Reviews have already resulted in sites being taken out of the greenbelt in Cherwell and South Oxfordshire. It would therefore be unwise to promote any relaxation before current land allocations are taken up and implemented. But looking beyond 2030 and towards 2050, it seems eminently sensible that a spatial plan for Oxfordshire, or more importantly the Central Oxfordshire corridor, should consider reallocating say 5% of the greenbelt to areas where the quality of the landscape or ancient villages needs to be defended from unwanted intrusions. Higher density development should then be promoted in 'Growth' areas or zones that are or will be accessible by high quality public transport, thus reducing CO_2 emissions.

14   Shaun Spiers, How to Build Houses and Save the Countryside, Policy Press, 2018

e. Resolving key issues

This section has shown the potential for packaging finance from private as well as public sources to fund the infrastructure needed for the sustainable growth of Oxford (which should include affordable or social housing as well as transport, energy and water.) The kinds of questions that need to be answered through further research in Oxford (and other comparable cities) should focus on implementation and delivery systems, and include:

1. How much revenue could a charge on the completion of new housing bring in, would it slow down completion rates, when should the charge be levied, and how well would it be received compared with existing charges or taxes?

2. How far would a system like that used in Germany, Denmark or Holland (as summarised in previous research) pay for the costs of local infrastructure in high value areas such as Oxford?   Would provision of local infrastructure before building increase the completion rate?

3. How would the proceeds be collected and apportioned between different forms of infrastructure including social housing?

4. Who would collect the funds and ensure they were spent as intended, and some form of democratic oversight retained?

5. How would a development bond work, how much could be raised, and under what conditions?

6. What support could be secured for changes in the way rates or the Council Tax was raised, including a system that distinguished between the value of the house, such as its replacement cost, and the value of the land on which is stands?

7. How much could be raised through different funding mechanisms, and

could a Danish-style approach, as in Copenhagen for example, be made to work in a British city?

8. Who should be represented on Task Forces, and how might the necessary coordinating bodies be set up to deliver complex projects that combine public and private finance?

Appendix A
Funding the SpineLine:
An illustrative case

The idea of 'metroisation' was put forward by Network Rail's current Chair, Sir Peter Hendy, as a means of encouraging people to shift from a dependence on cars by making more use of the existing railway system through frequent 'turn up and go services'. The concept is particularly relevant to rapidly growing cities such as Oxford and Cambridge or York, where there are conflicts over where new development should be concentrated and how it should be funded. Cities are in competition for investment. In an important review by an eminent Commission for the Cambridgeshire and Peterborough Combined Authority, a prime recommendation was that the government should recognise the city as being in competition with similar cities in other countries. The same message applies to Oxford, as does the objective of doubling not just the amount of housing but also the number of good, high paid jobs over the next twenty or thirty years. 1

In the Oxfordshire Futures 2050 report produced on behalf of the Oxford Civic Society, a proposal was put forward for an Oxford Metro system to be developed as an integrated system in four stages with different elements with options. The first stage was to make more use of under-used railway lines and to relieve pressures on what a government study led by David

1   Kate Barker, Cambridgeshire and Peterborough Independent Economic Review,2018
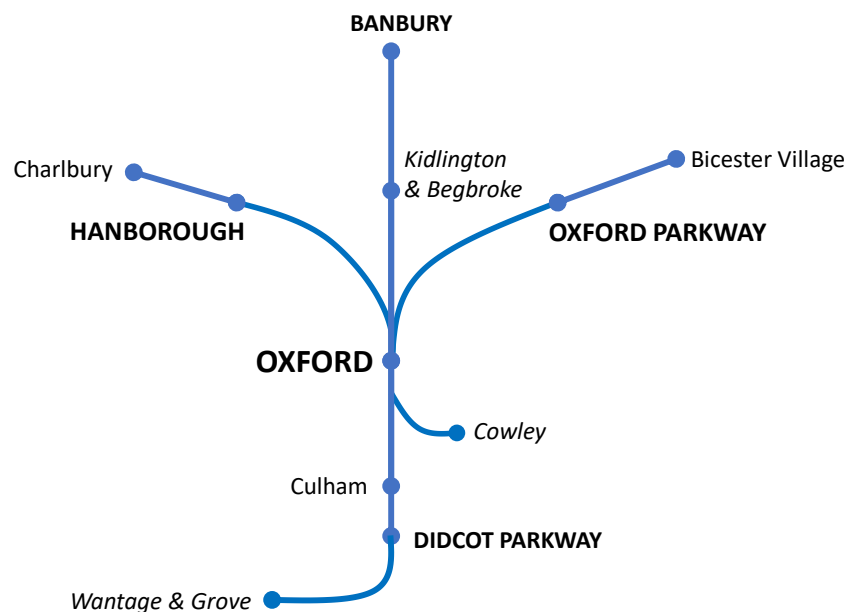
Options for the northern end of the Spineline - Source Ian Baxter

Willetts MP labelled The Oxford Science Spine. What we called the Oxford SpineLine would run from Bicester and Kidlington or Begbroke through to Didcot and later Milton Park with a branch to Cowley, which ideally would open first. However, the proposal, despite being supported by the Oxford Civic Society and others, did not receive sufficient consideration in the Oxfordshire Rail

Corridor Study (ORCS). Other options were favoured such as using Hanborough as a rail hub once a further section of the Oxford to Worcester line has been dualled, which in turn depended on major investment in expanding capacity at Oxford Station and on the Oxford to Didcot line, which may not be forthcoming in the foreseeable future.

Northern Gateway

Oxford Parkway

Summertown

Oxford

Botley

Headington

P&R A40E Thorn

P&R A420 corridor

Cowley

Redbridge

Oxford Business Park

BMW Cowley

Blackbird Leys

Oxford Science Park

P&R A34 North Abingdon

Radley

P&R A4074 corridor

Spine Line with interchange
Other local rail with interchange
Section subject to study Existing station
New Station
Possible future station
Proposed bus rapid transit
Existing/planned employment
Possible future employment
Planned housing
Possible future housing

Culham

Appleford/
North Didcot

Milton Park

Former Power Station

Valley Park

Gt Western Park

Didcot Parkway

The SpineLine as an integrated system source: Peter Headicar

To achieve a major shift to rail, new stations are needed as well as a different pattern of services, and the British experience is still limited. Station costs vary significantly, depending on the scale of the development and the complexity of the railway. The new station built to serve the new settlement at Cranbrook just outside Exeter, cost £6 million for one platform plus waiting facilities, much of which is attributed to the extensive car park. Exeter now boasts nine stations compared with two in Oxford, and they are doing good business. A three-mile-long 'dynamic loop' at Axminster to allow trains to pass each other on an otherwise single line cost £16 million. The complex station at Portishead near Bristol is expected to cost £12 million, and again land for parking explains a lot of the cost.

Experience at other stations suggests that lower costs can sometimes be achieved, but costs can vary widely. Thus, Newcourt in Devon cost little over £2 million and is now open to the public. A two-platform station at Marsh Barton cost £7 million, whereas Pye Corner at Newport is costing over £3.5 million with £2.5 million coming as a government grant. If we assume that new stations that are approved by the Department for Transport continue to receive grants for two-thirds of the capital cost, then the returns would improve, and 'value engineering' should bring costs down further, for example through using prefabrication. A major element in station costs can be bridging over the track, which can add £2 million to the costs. Work is needed urgently on how to match best practice in other countries that have built far more recently at significantly lower costs.

a. Lighter railways?

In the Oxfordshire Futures report the proposal was put forward for creating a SpineLine to link up employers along the route with other services. In the late 19th century, the UK changed the laws to make it easier to build light railways and urban tramways. A similar approach is needed now. For example, costs can rise if freight lines are upgraded to passenger standards. But if the services are running on existing track and at limited speeds, they should not have to pay for upgrading it), only for any congestion and extra wear they impose. With frequent stops every mile or so on the Cowley Branch, for example, speeds are not likely to exceed 25mph, and the original principles of a 'light rail' system could be applied. Thus, there would be less need to build bridges over the line, and properly equipped level crossings should suffice where minor roads are crossed outside urban areas as with light rail lines.

The Light Rail Act, which was introduced in 1896 to enable low cost lines to be opened in rural areas, could usefully be revisited to come up with cost-effective solutions that balance a range of objectives. For example, drivers might even escort disabled passengers over the line, as happens in France). If there are to be benefits from Brexit, they should come from querying established ways of doing things that hold back investment, such as the costs and safety value of high clearances for overhead 25 kV AC catenary.

Raising finance from Land Value Capture may require modifications to the 1961 Land Compensation Act. Compulsory Purchase (CPO) powers have been restricted by parliament to the area just required for transport purposes and disregard the potential for developing something profitable alongside. If land is allocated for a transport hub, there is a case for recovering the uplift in value from land within a kilometre or an east walk. If a properly constituted development corporation was set up, land could be assembled at close to existing use value plus a reasonable premium, and not have to compensate the landowner for what it might be worth as housing land.

A similar principle should apply to land used for parking, which would be run by

the operator with the charges helping to cover running costs, and with design codes to encourage multi-storey parks at busy locations. If the project is carried out with low cost, 'patient capital' requiring a return of say 4%, it should not have to carry a profit charge of 8% or more, let alone the 20% or even more that house builders may be aiming for. Metroisation should not be constrained by the mind-sets and standards used to plan cross country heavy rail lines, and Oxford should provide a useful test case.

b. Adding up the costs

A figure in the ORCS of between £30 and £50 million was estimated. Further work on ORCS is required to examine the costs for stations and upgrades on the whole Oxford to Didcot line so the following figures are for illustrative purposes only. To estimate the capital costs let us assume that there would be one new double track station at North Kidlington or Begbroke Hill to the North of Oxford. An alternative proposed in the ORCS study is an upgraded Hanborough Station, where a second platform is planned by the North Cotswold Line Task Force. However if some trains are to terminate there a turnback siding/platform may also be required), and two or three new single track stations would be desirable on the Cowley branch, to serve the Oxford Business Park and also serve Blackbird Leys and new housing South of Grenoble Road.

It would seem reasonable to assume that a SwiftRail service, inspired by the German and Swiss Schnellbahn model, could be instituted in Oxford, assuming running rights over Network Rail lines. The capital cost for the first stagae could be £30million, from Oxford Central to Cowley. This would require bi-directional running, as recently installed, on the up line to London or the use of spare track alongside on the Hinksey Yard line to the west. Alternatively, this line might form the first stretch of an experimental

tram train line rather as happened with the Dockland Light Railway in London, which opened up development there,

The big cost items relate to running to Didcot. Network Rail are calling for four track lines to ensure freight trains are not delayed, and the redevelopment of Oxford central station, which is an extremely poor gateway to the station, and needs extra platforms. This will surely cost at least £500 million as there are two crossings of the River Thames between Oxford and Didcot, the land is generally flat and affected by floods, and a grade separated junction is proposed at Didcot. A passing loop near Culham could be accommodated relatively easily, though it might add £15 million to the costs. The capital costs of turning trains round at Didcot would be covered by the works necessary to handle the Oxford line once the main line is electrified. Hence the more frequent trains envisaged when Swift Rail services are run should only have to cover their operating costs, plus a wear and tear charge. To these should be added the capital costs of reopening the line to the industrial estate at Milton Park, which could then serve Harwell on the other side of the line at a total cost of perhaps £60 - £80m.

c. Redeveloping the central station

The biggest issue or opportunity to be resolved concerns Oxford Central station. Currently most Chiltern Line services from Marylebone terminate in the bay platforms, which are limited to 5 x 23 metre coaches, for the time it would take to run down to Cowley and back. Longer Chiltern Line trains must reverse in Hinksey Yard to the south of the station. But there may not be enough train paths. One answer lies in the Network Rail proposal to extend additional through platform lines over Botley Road bridge, Another solution, envisaged in the original engineering

studies by Arup was to run a 'light rail' line where the station buildings currently sit, so there was a dedicated route through to Cowley. Something similar might be achieved through two way working on the Up Platform now that Oxford has been resignalled.

As the whole Oxford Central West area around the railway station is up for redevelopment, there is a strong case for revisiting the station master plan, (as Atkins may be doing). A full feasibility study needs to consider how much value could be contributed from intensive commercial and mixed use development on both sides of the line around the main railway station, including higher value housing that would benefit from better rail services. An analysis by architects Fereday Pollard in Appendix C shows how linkages might be readily improved. A new bridge across the railway lines and river, as envisaged in the Oxford Central West report, would join up Oxpens with Osney Mead adding 'marriage value' to both sites. Along with the Botley Road retail park and Park & Ride site this would create a development area of at least 200 acres in all, or some three times the size of the highly acclaimed Kings Cross railway lands development in London.

A comprehensive approach of this kind would be the way Oxford's rivals would act, as in the examples of Grenoble and Freiburg, or Amersfoort in the Netherlands, which a party from Grosvenor and Oxford visited a few years ago. Such a proposal could win support from those who currently are opposed to growth in Oxford because of their fear of losing green space, and hence is worth a reassessment given the scale of investment required in the area. With the government having decided that the development around Oxford, Milton Keynes and Cambridge is a national priority the case for intensifying developments around existing railway lines if strong. Hence there is a good case for not only speeding up the railway works, as proposed, but also accelerating development

around a new station. This could be achieved through a Development Corporation to acquire all the sub leases and service land before plots are sold off to developers within development briefs and design codes, or through some other form of public private partnership.

d. Raising the finance

Once the land can be assembled in advance of agreed plans or land allocations, the uplift can be used to help fund the infrastructure costs. Finance could be raised privately from financial institutions such as Insurance companies, and the University of Oxford has already set up a 50:50 partnership with the giant insurance company Legal and General (L&G), who have committed £4 billion to provide new homes for staff and the 'creation of science and innovation districts.' One of the sites would be at Begbroke, where we have proposed a new station.

If a budget of say £80 million were allocated for the SpineLine, which was considered realistic for MetroWest in Bristol, the Department for Transport might be convinced by the business case to provide a grant of say £20 million. The Spine Line project would need to fund £60 million from developments alongside or near the railway stations. The current way has been to fund local infrastructure from planning gain through Section 106 or the Community Infrastructure Levy (CIL) on developers, which can be tortuous and will discourage developers in what is a complex situation. However, the government's White Paper on The Future of Planning proposes simplifying the system and replacing it with an Infrastructure Levy on the value of housing when it has been completed, and Oxford could provide an excellent place to test out the likely impact of alternative scenarios.

Given the scale of demand for housing around Oxford, URBED proposed a series

Potential for land value uplift sharing varies across the country	Stoke-on-Trent	Peterborough	Reading	Sutton
Average open market value £	160,000	230,000	300,000	410,000
Density dpha	30	40	60	120
Affordable housing (AH) %	10%	20%	25%	30%
Per hectare				
Market sales value £pha	4,200,000	7,300,000	13,400,000	34,500,000
Less				
Land acquisition and preparation £pha	500,000	700,000	1,700,000	4,200,000
All in development cost £pha	3,700,000	5,700,000	10,000,000	25,400,000
Balance for uplift sharing £pha	-	900,000	1,700,000	4,900,000

Value uplift comparison
by Pete Redman of
Housing Futures

of 'garden city' extensions or satellite neighbourhoods with 5,000 homes on the edge of the City in the submission which won the 2014 Wolfson Economics Prize. We might expect a contribution of at least 5,000 homes on the line to Cowley with an average value of £300,000 (assuming a high proportion of affordable homes). With a CIL rate of 10%, this would be enough to cover a quarter of the capital costs. Incidentally, the average house price in Oxfordshire in 2019, according to Right Move, was £430,000, one of the highest in the UK.

But if the land were transferred to a development agency, and the whole of the land value uplift were to be used to fund local infrastructure (as it would be in Copenhagen or Freiburg, for example), then the capital costs might well be recovered.2 Tom Aubrey has calculated for the East West company that some £600 million could be raised from the uplift in land values in Oxford, and he proposes an integrated transport and housing plan to overcome the need for CPOs or Human Rights issues (though this requires a minor change in the 1961 Land Compensation Act).

The table above produced by Pete Redman

of Housing Futures, who produced the calculations for the Uxcester Garden City plan, indicates the scale of the potential to be tapped in different situations. Development around Cowley, assuming good rail connections, is likely to achieve a similar land value uplift to Reading, or £1.7m per heactare.

Let us illustrate the scale of the potential revenues that a simple levy on market value as proposed in the Planning for the Future White Paper could yield to the public purse along the whole of the proposed SpineLine or the area of the OxMkCam arc. An area within a kilometre of a minor station, (perhaps two kilometres at a junction like Oxford) could yield up to 300 hectares for dense development or say 12,000 homes at a net density of 40 to the hectare (3-4 storey on average). Half the land would be devoted to open space of all kinds, including green and blue infrastructure, to create a garden city type environment. At an average house price of £300,000, an Infrastructure Levy of 20%, a levy would yield £720 million: – getting on for a billion pounds. Say a third might go to providing social housing, but still leaves enough to pay for local transport infrastructure, as well as to pay compensation for taking over existing uses With lower suburban densities of around 25 to the hectare or 12 to the acre, and assuming

higher levels of open space, the contribution would still be sufficient to cover the costs involved in opening rail services, even before the benefits were factored in.
Once the government has given a commitment to ensure that the redevelopment of Oxford Station proceeds, the whole project might be funded through private investment. This could be done through a successful bond issue. For example, Cambridge University raised £350 million to develop farmland that has been taken out of the green belt in North West Cambridge at Eddington, and Oxford University has also had little trouble in raising capital through a bond issue. This should help make the case for using reforms of the CPO system to enable faster housing development, as put forward in a report for the Greater London Authority, as it does not depend on government guarantees which count against government borrowing.3

Lessons from elsewhere should be applied. Most of Oxford is competing for housing investment with areas like Reading or Sutton in London's suburbs. Where Oxford can learn most from similar university cities like Grenoble or Freiburg or from the 95 new suburbs constructed under the Dutch VINEX programme, as well as housing developments linked to railway stations in mid-sized cities such as in Utrecht and Eindhoven.4 Transport infrastructure is a necessary condition for growth, but it is not a sufficient condition. It is a means not an end. Therefore, proper strategic planning and economic analysis are critical to avoid government being carried away by pipedreams or failing to see the bigger picture. There is no longer the capacity to absorb cost increases once a project starts so analysis of all the options before careful procurement is essential.

3   Capital Gains: a new land assembly model for London, URBED with Dentons and Gerald Eve, 2019

4   Nicholas Falk, Land for Housing, URBED Trust, 2019, www.urbedtrust.com

e. Securing economies

As well as understanding what generates value it is also essential to look at ways of reducing or controlling costs. Earlier consultations with organisations such as Oxfordshire County Council found scepticism about the possibilities of being able to raise enough funding to support a proper rapid transit system, especially if tram lines were provided along some of the streets. However, a large proportion of this is likely to be making up for poor historical maintenance, which should be charged to the road budget. The costs of rail-based developments can seem frighteningly high and tend to escalate once the decision has been made, probably due to the way projects are procured in the UK. This led a cautious Labour Minister of Transport, Alasdair Darling, to abandon well-worked out tram schemes. Major cities such as Leeds, Portsmouth and Bristol have been left without proper public transport systems, and lag decades behind their Continental equivalents, which hurts their economies. The many visitors to historic cities like Bath and York suffer from congestion and pollution while ancient cities such as Gloucester have not yet recovered from war-time bombing and have suffered from ugly sprawl that green belts were supposed to have prevented.

Not surprisingly the Infrastructure and Projects Authority has called for costs to be analysed and shared after projects are completed. Unfortunately, experience is still far from clear, as a comparison of the costs of British with Continental and American light rail schemes brings out. Probably the best lessons can be drawn from French experience, as there have been many projects in similar sized towns involving both reserved track and street running, which can be much more expensive. A recent survey found that since 2000 Europe has opened 70 new tram or LRT lines, and the average length of the new lines is 4.5 miles. Germany and Central Europe account for half of all

patronage. 28 of the new tram systems were in France compared with 10 in the UK (where there have been some interesting experiments with paring back costs). In the case of the Spine Line, which would count as 'heavy rail' we have used figures from the few recent rail projects whose costs have been published, where the costs tend to be higher because of higher speeds, and hence more complex signalling.

Infrastructure costs are inherently complex, but excessive time is spent in the UK in gaining agreement while politicians (and political parties) come and go. In considering costs, it is vital to distinguish between the marginal costs of adding new services, and the average costs that existing operators are paying. If, as generally agreed, there are major benefits in shifting traffic off the road and on to rail, it would not be right to charge for more than marginal costs, that is the extra wear and maintenance costs of additional traffic. As most local authorities do not have staff with the necessary understanding of transport economics and must rely on consultants to fill the gaps, it is difficult for them to reconcile development and transport decisions or overcome objections. Hence the process needs to be properly structured.

Funding for feasibility and planning studies also must compete with other more pressing priorities. Developers required to do viability assessments inevitably conclude there is little surplus to pay for social housing or other infrastructure. So long as they compete for sites, they tend to pay over the odds for land, and then cut back what they provide in the way of benefits. Most British developments end up being car-based, with too much space allocated to tarmac, which is bad for the local environment. Reductions in the costs of congestion and pollution by modal transfer to rail are externalised and unaccounted for. The model from Germany or the Netherlands of a public agency providing local infrastructure in advance of disposing of sites for development is therefore highly relevant. Fortunately, in Oxford much has

already been spent on creating new sidings at Oxford. An article in the April 2020 edition of Modern Railways explains that a lot has already been done with new signalling and points to upgrade capacity. This investment needs to be recovered through increased utilisation in a 'post-Covid' world.

f. Reducing the risks

The cost of upgrading railway capacity around Oxford are inevitably high because of the sheer complexity of the system, as Oxford lies at the heart of the UK's railway network. Hence it essential to minimise the risks and avoid further 'stop go' as with electrification. One current example of the way costs can escalate is the reopening of the Portishead branch line from Bristol through the Avon Gorge. An article in Modern Railways April 2017 under the headline 'MetroWest cost trebles' contrasts the cost estimate of September 2014 of £58 million for the nine-mile line with a revised figure jumping to between £145 and £175 million. The reasons given by Network Rail were delivering the line speed for two trains an hour, the impact on a level crossing and 'the consequential impact of the amount of land and planning requirements and increased delivery risks.'

Comparative studies have shown that railway construction costs in the UK are often double the European level, sometimes attributed to higher safety standards. An important report from the Institution of Civil Engineers (ICE) suggests that the costs are not due to low British productivity, as often alleged, but to the 'transaction costs' and higher profit requirements due to the UK's peculiar procurement system.5 This was made worse by the fragmented railway industry since privatisation. Privatisation led to the loss of experienced railway staff, who then were re-employed as consultants to private companies

5   From Transaction to Enterprises, ICE Infrastructure Client Group, March 2017

with limited experience of running railways. This has resulted in an excessively adversarial and risk averse system in which both the customer and the taxpayer lose out.

g. Valuing all the benefits

Because of the importance of accounting for multiple objectives or criteria, further work is required on the likely impacts of the different options, and the work on Oxford Futures has led to a number of suggestions for what the overriding criteria should be. It would be wrong to rank them, as their value varies according to who is affected. But six impacts could be measured and weighted up when alternative scenarios are considered, and a spatial plan for the next thirty years agreed.

Predictable travel times It is not just time savings that matter but being sure how long it will take to make a journey. Much time is wasted due to congestion. Yet time spent in a comfortable railway carriage can be used for other purposes, while cycling and walking are good for your health. Time spent at interchanges also needs to be factored in, but well-designed can add to the pleasure of a journey.
More affordable homes Simply building more homes will not engage local support if they end up as second homes or rented out to students, while others have little hope of ever getting a foot on the housing ladder. Locations vary in their suitability for people living on low incomes, which should influence the development brief and design codes.
Private investment and cleaner air The level of investment in the UK has been low for a long while, and there has been much talk about Green Growth forming the basis for recovery from the Covis-19 epidemic. Investment in projects and locations with lower environmental impacts should therefore be given extra encouragement, while isolated locations that would be car-dependant should be marked down even if

there is talk of using electric cars, as their tyres create a health hazard. Cities known for their wellbeing or quality of life will have the strongest appeal to employers in the knowledge economy.
Better jobs and lower living costs Again it is the quality and not just quantity of jobs that needs to be considered. University towns give rise to low paid jobs in hospitality (in normal times), which is why accommodation close to where people work is so important. So, for example, by linking up the Radcliffe hospital complex by tram to park and ride sites on the periphery, staff will have less need to own cars, and will have more time to spend with their families.
Oxford as a leader in innovation While Oxford is known world-wide for its research record, it needs to be equally famous for turning good ideas into marketable products or processes. By applying the expertise already within the City to the problems of sustainable growth, there will be extra value from the funds invested in research to everyone's benefit. Importantly it the application of inventions, not the number of patents, that creates most value.
Model for smarter urbanisation Finally as a place that is known world-wide, especially now for popular television series, Oxford should be able to exert considerable influence on the pattern or form of future growth, and the management processes used to achieve it. Hence if Oxford can bury its historic differences to show how diverging interests can be reconciled, it should become a model for cities in rapidly growing economies through out the world as well as for other mid-sized towns and cities in the rest of the UK.

Conclusion

This appendix makes the case for a full evaluation of a range of transport options under different scenarios for growing Central Oxfordshire and locating strategic new housing. It has used figures from comparable projects to estimate the scale of investment and funding required to achieve Metroisation in Oxford. The analysis will require further refinement before a spatial growth and investment plan can be agreed. While the unprecedented scale of the fallout from the Covid-19 epidemic may lead to delays in making decisions, there are countervailing arguments that rethinking strategic planning and infrastructure investment has never been more important.

Whether or not this project forms part of a larger development scheme, an incremental approach is needed, starting with projects that produce early and visible results. Through planning agreements that provide benefits for the existing community from land value uplift, much better outcomes could be secured for all the main interests. There are also exceptional opportunities for innovation which should command wider interest. The growth of Oxford could offer a model for other historic cities. Alternatively, it could be another case study of the failure to grasp the opportunities and respond to the challenges in time.

Appendix B
Learning From Success

As the UK lags so far behind countries like France, which has built ten times the length of tramways we have over the past couple of decades, it is important to learn from cities that face similar challenges. As far back as 2008 URBED was drawing on Freiburg to show how 'eco town' principles could best be applied through Sustainable Urban Extensions rather than new towns.[1] This is because the upfront costs of a free-standing new town are simply too great to be met without a level of subsidy the government is no longer able to provide. The much-acclaimed city extensions at Rieselfeld and Vauban, along with other policies, have helped the city of Freiburg reduce car use from a half to a third of all trips.

a. Planning innovation

Copenhagen has funded its first Metro line from the uplift in land values from redeveloping a former army barracks at Orestad, and is now building a second line. Copenhagen is the cycling capital of Europe with over 37% of trips by bike, made possible because cars no longer dominate the central streets. The Metro is driverless and largely above ground, and connects the city centre with the airport. Orestad incorporates a major university as well as the largest shopping centre in Scandinavia, and 20,000 homes are to be built of which about half are completed. The best model for Oxford is its twin city of Grenoble, which was the subject of a

joint conference on promoting health and wellbeing. Grenoble was the first city in France to reintroduce trams after the Second World War, and has continually extended its system. The basic principle used in planning French local transport systems is to connect up large traffic generators such as the main station, the hospitals and universities.(Exhibit 25) But under the French planning and development system, trams are not assessed simply for their impact on traffic (as in the UK). French planners see trams as central to upgrading the historic heart as they enable street space to be given over instead to cafes or simply sauntering to look at the shops. They are also used to connect up disadvantaged housing areas, or places where new housing is to be built, as in Montpellier, for example, France's fastest growing city.

Though half the cost of introducing a tram goes in rebuilding the streets and underground utilities, often as a result of earlier deferred road maintenance, the benefits come from increased footfall, and hence property values for the businesses in the city centre. Larger employers contribute towards the costs through the Versement Transport, a charge on their payroll.

b. Financial innovation

With very limited public funds for capital projects in the UK, other sources need to be tapped. Though the UK does not yet have a transport charge, in London a supplement was added to the Business Rate to help fund Crossrail, and a Congestion Charge is used to fund

1. PRP URBED and Design for Homes, Beyond Ecotowns: applying the lessons, PRP 2008 www.urbed.coop

better buses. In Nottingham a charge on employers' car parking not only generates substantial funds, but also acts as a deterrent to parking where the trams offer an alternative. But as the real beneficiaries from transport upgrades are those who own properties close to them, many have argued for sharing in the uplift in land values from transport improvements.[2]

There are three ways in which the costs of investing in a Metro system can be recouped. The first, which is used in Britain, involves negotiations with developers for what is called Planning Gain. A development framework, supported by planning policiies, can require contributions through either Section 106 planning conditions or from the Community Infrastructure Levy. Unfortunately CIL raises only 25% of the costs at best, and is resisted by developers because it involves paying over funds before the development has begun or values have been realised.

This second, and the one recommended by the World Bank Group in an important study, is to acquire land alongside stations and then sell off the development rights.[3] This is what built the Hong Kong and Singapore Mass Transit systems through what are called Floor Area Ratios (FAR). But it is not necessary to build tower blocks to benefit, as Smart Cities such as Portland Oregon have shown. Starting with Metropolitan Area Express (MAX) which extends into the suburbs, the city has densified areas such as around the main railway station and along a new 'streetcar' line through former industrial areas. Transit-Oriented Development is used to recoup investment through Tax

Increment Finance, whereby the City borrows against the prospective uplift in property taxes from the new stations and services.

The third way, also used in the USA in cities such as Pittsburgh in Pennsylvania and now in Canberra in Australia as well as in Danish cities such as Copenhagen, is to adjust the property taxes so that they distinguish between the value of the land and the value of the property on it. It is the land value that increases as a result of new transport investment as various studies have shown. By using Compulsory Purchase Orders[4] more adventurously, and through some changes to the Land Compensation Act, it would be possible to secure much greater public benefits from any area around where major improvements are being made, such as the planned redevelopment of Oxford Station. This forms the basis of a report for the Greater London Authority, with a series of case studies.[5]

2. See for example the work of the Scottish Land Commission

3. H Suzuki, J Murakami, Y-H Hong and B Tamayose: Financing Transit-Oriented Development with Land Values: Adapting Land Value Capture in Developing Countries. World Bank Group, 2015. https://openknowledge.worldbank.org/handle/10986/21286

4. Fiona Ferbrache and Richard Knowles, An investigation into the economic impact on cities of investment in light rail system, UK Tram, June 2014

5. Nicholas Falk, Capital Gains: a better land assemby model for London, URBED and the GLA, February 2018

Appendix C

Oxford Station - opportunities to improve and connect green and blue infrastructure to support a wider interchange strategy that works at a local and regional level.

The analysis in this appendix is by Fereday Pollard Architects, and builds on the analysis already done by others in recent years. This review suggests possible approaches and potential opportunities at Oxford Station and the surrounding area via the diagrams described below:

a. Opportunities for a masterplan

The indicative masterplan on the following page gives an indication of opportunities around Oxford central station. At the core of this masterplan is the aim to improve the experience of cyclists and pedestrians through the development of the Oxford Central Transport Hub and surrounding areas such as Osney Mead. Intertwined with these proposals are opportunities to connect existing green spaces with new biodiverse green corridors, including green bridges and Biosolar green roofs.

During this process Fereday Pollard have noted opportunities to build new housing near the train station, in areas that can be screened from nearby sources of noise.

b. Botley Road Bridge

The 3D axonometric drawing highlights opportunities and constraints for integrating an enhanced Transport Interchange with redeveopment of the rail bridge over Botley Road.

The Botley Road-rail interface creates some tight constraints. Resolving these challenges effectively is key to unlocking the wider area. This diagram shows a pair of cycle routes at a higher level than the tram / vehicle area. This could allow pedestrian flow from the tram to the train station without the need to cross the cycle routes.

Construction of this approach would be less disruptive if the bridge shown in Exhibit 11 has been constructed early in the process.

c. Phasing Plans

These four diagrams illustrate how the logistics of the railway can be expanded. An incremental approach is illustrated showing a possible response to funding availability and developments in demand for rail transit.

The aim has been to avoid the need to demolish existing buildings and minimise disruption to existing trees. The phased approach allows for minimal disruption to train services during construction. If completed this arrangement would allow many trains to pass through the station from north to south without the congestion caused by terminating platforms.

Key:

- ← - - - - - - - Possible tram links

- ← - - - - - - - Opportunities for enhanced cyclist / pedestrian connectivity along watercourses

- ← ——— Opportunities for cyclist / pedestrian connectivity along biodiverse green infrastructure (incl. green bridges & green roofs)

- ⬭ ⬜ Opportunities for new interchange with regional / subregional connections

- ◯ Opportunity areas for improved pedestrian experience & local connections

Indicative masterplan drawn by Fereday Pollard for the URBED Trust, showing opportunities around Oxford train station.

Existing Westgate Hotel

Existing YHA Building

Existing rail tracks

Trees to be retained

Opportunity to extend platforms

Opportunity for new station entrance

Key:
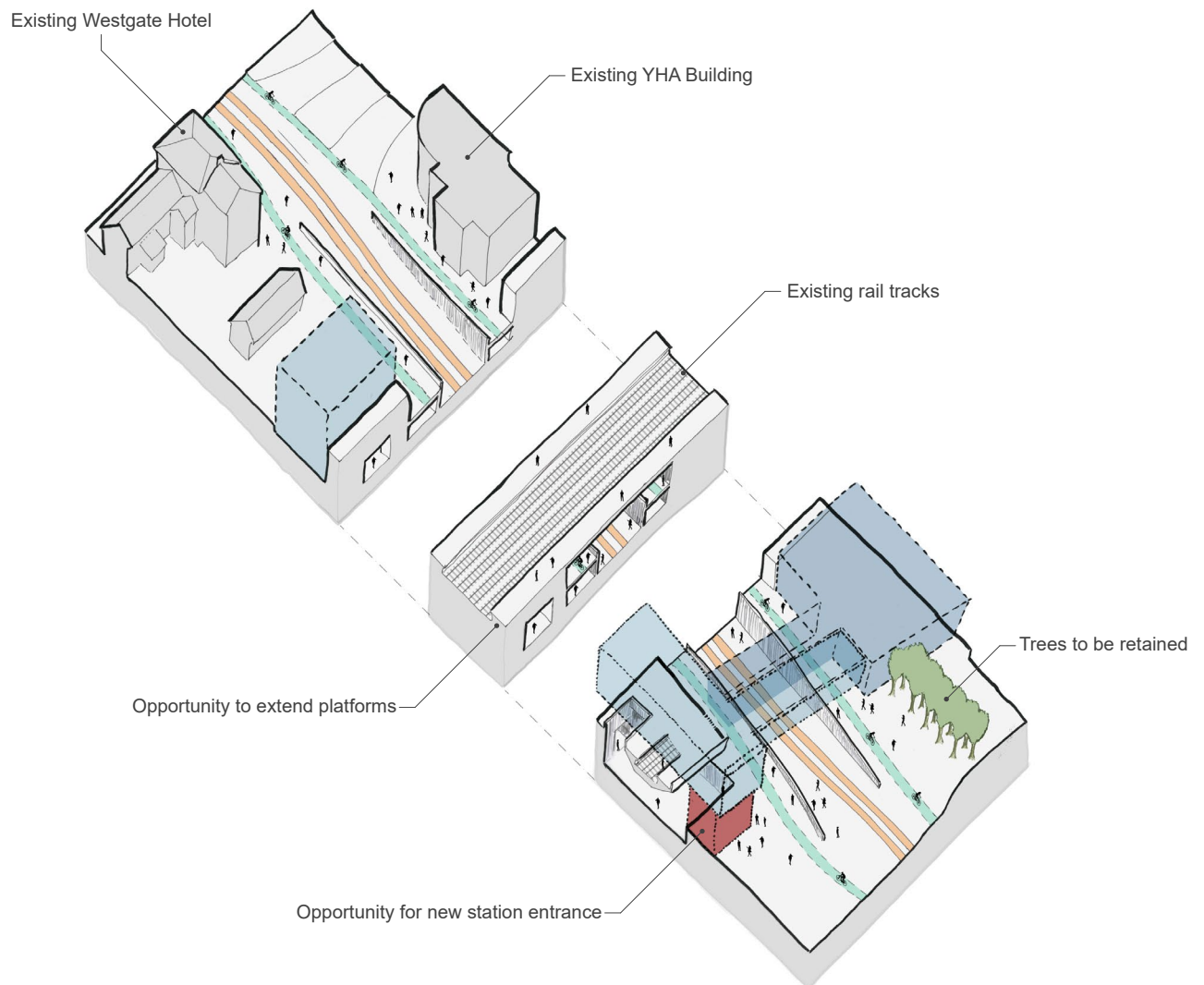
Possible tram link along Botley Road

Opportunity for new cycle route under railway

Zone for phased Innovation Hub integrated with Transport Hub

Indicative axonometric diagram showing opportunities to integrate new cycle routes and tram under the Botley Road bridge.

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Existing Chiltern Railways platforms

trains to Worcester, Manchester, Bicester and London Marylebone

Future trains to Milton Keynes & Cambridge

Existing Platform 4

Existing Platform 3

Existing train station

Botley Road

River Thames

existing station car park

Oxford Station rail diagram - possible phasing

Site Diagram As Existing:

Car park to the south of Botley Road can be seen as an opportunity for development and improved connectivity.

Key:

New station facilities

New rail platforms

Osney Cemetery

Trains to Didcot, Reading and London Paddington

Potential future trains to Cowley and Wantage & Grove

Image courtesy of Fereday Pollard

Existing Chiltern Railways platforms

trains to Worcester, Manchester, Bicester and London Marylebone

Future trains to Milton Keynes & Cambridge

Existing Platform 4

Existing Platform 3

Existing train station

New station entrance

River Thames

Botley Road

Opportunity to develeop existing car park in conjunction with development over new platforms

Oxford Station rail diagram - possible phasing

Phase 1 A:

Two new platforms may be built within the car park the to allow more trains from the south.

These would also allow trains to run during future construction phases.

Key:

New station facilities

New rail platforms

Osney Cemetery

Trains to Didcot, Reading and London Paddington

Potential future trains to Cowley and Wantage & Grove

Image courtesy of Fereday Pollard

Existing Chiltern Railways platforms

Existing Platform 4

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trains to Worcester, Manchester, Bicester and London Marylebone

Future trains to Milton Keynes & Cambridge

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Botley Road

River Thames

New station entrance

Opportunity to develeop existing car park in conjunction with development over new platforms

Oxford Station rail diagram - possible phasing

Phase 1 B:

Platforms 3b and 4b added allowing greater capacity.

Existing trees retained

Osney Cemetery

Trains to Didcot, Reading and London Paddington

Potential future trains to Cowley and Wantage & Grove

Key:

New station facilities

New rail platforms

Image courtesy of Fereday Pollard

Existing Chiltern Railways platforms

trains to Worcester, Manchester, Bicester and London Marylebone

Future trains to Milton Keynes & Cambridge

Existing Platform 4

Existing Platform 3

Existing trees retained

Botley Road

River Thames

New station entrance

Opportunity to develeop existing car park in conjunction with development over new platforms
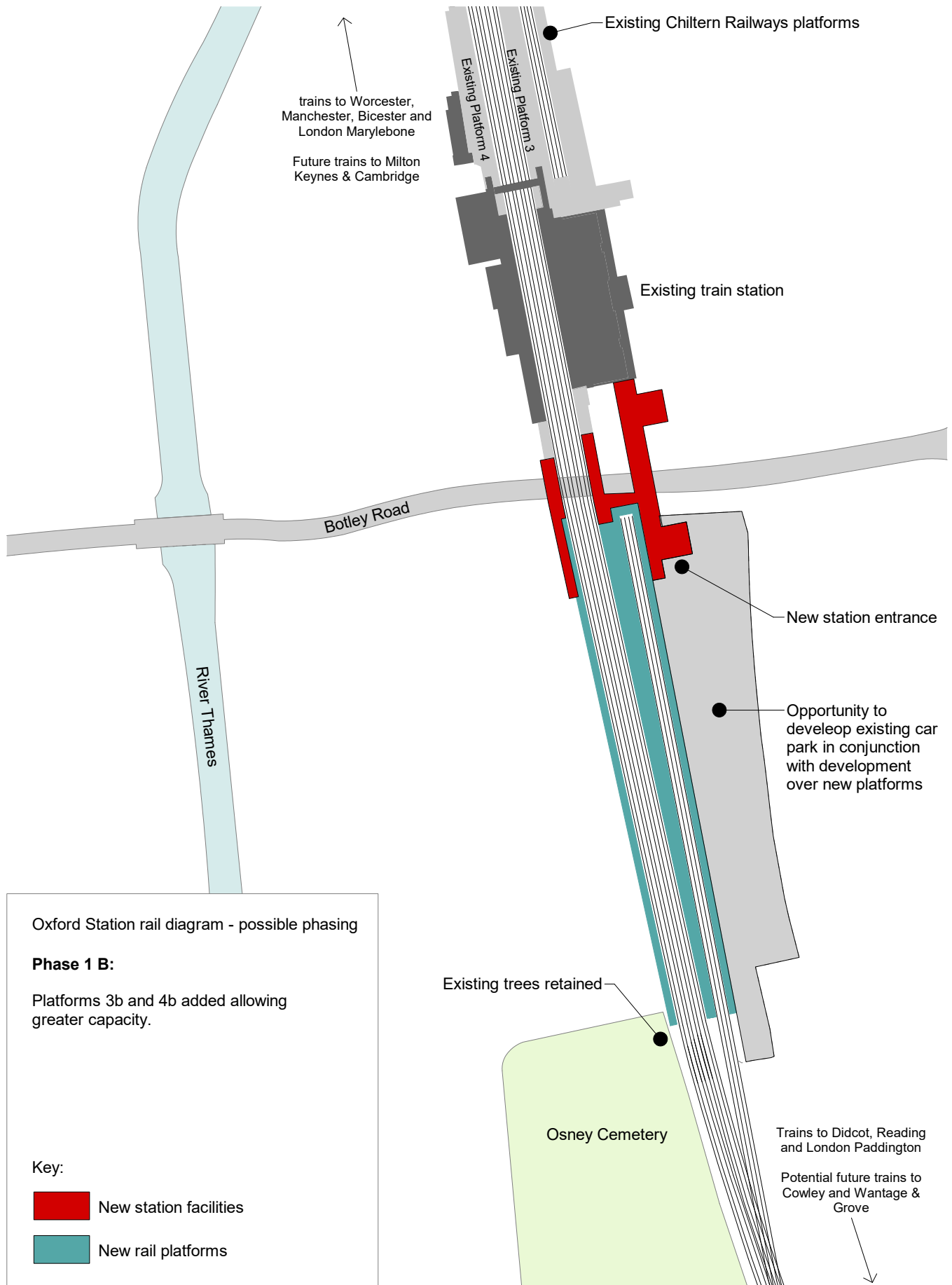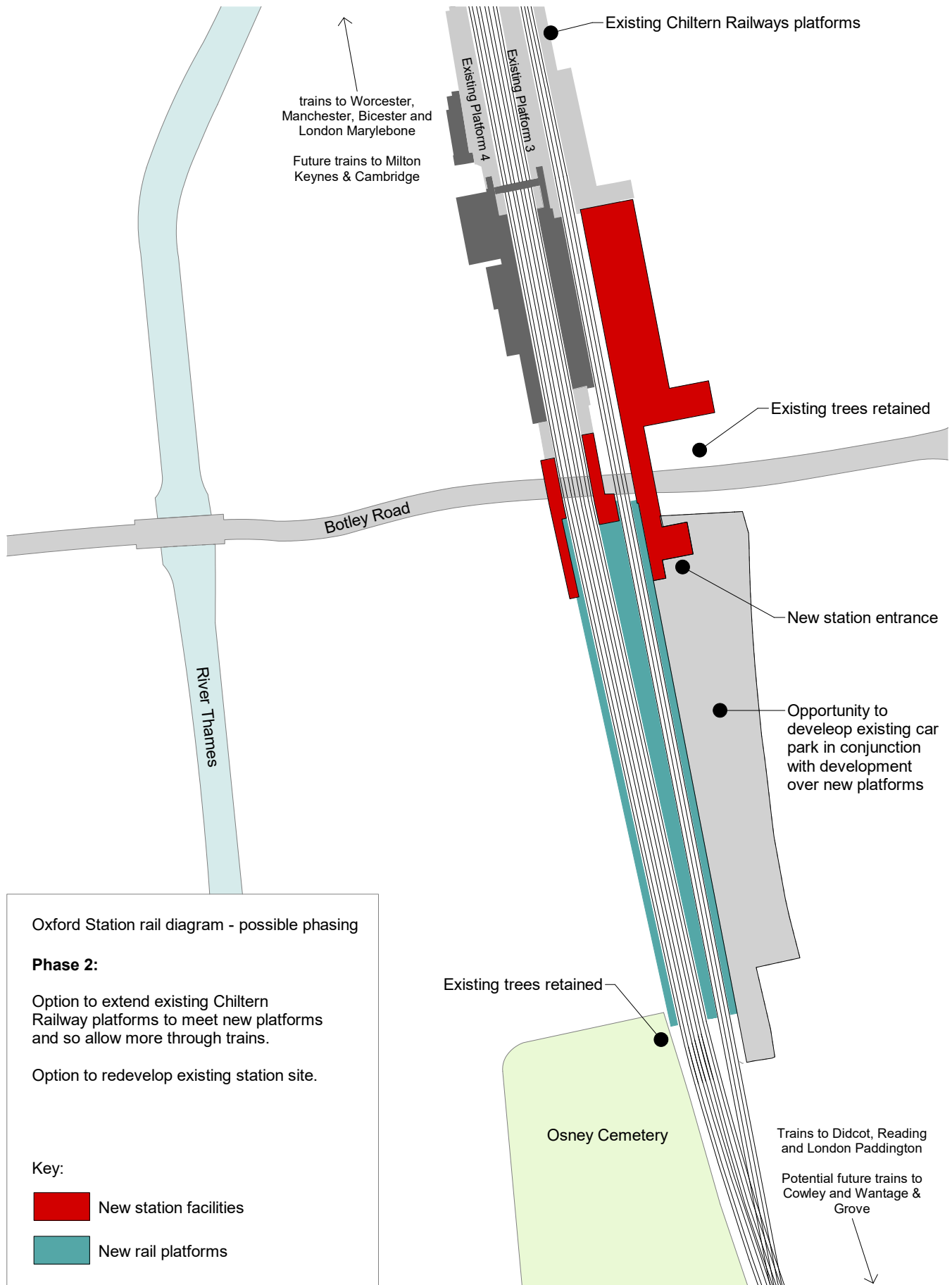
Oxford Station rail diagram - possible phasing

Phase 2:

Option to extend existing Chiltern Railway platforms to meet new platforms and so allow more through trains.

Option to redevelop existing station site.

Existing trees retained

Osney Cemetery

Trains to Didcot, Reading and London Paddington

Potential future trains to Cowley and Wantage & Grove

Key:

New station facilities

New rail platforms

Image courtesy of Fereday Pollard