Oxfordshire Transport
– Looking out to 2050 –

Oxfordshire County Council
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Reasons for a new Plan

There are three main reasons why we need to develop a new Local Transport Plan:

1. Reflect new priorities: climate action, air quality, healthy place shaping…
2. … Along with new funding (Oxfordshire Housing & Growth Deal, Housing Infrastructure Fund, Oxfordshire Garden Town/Village initiatives) and …

Local Transport Plan’s are statutory documents, required under the Transport Act 2008. We are calling ours the Local Transport and Connectivity Plan, to better reflect our strategy both for digital infrastructure and for connecting the whole county.
We start with a broad picture of Oxfordshire’s strategic planning. This is important because in the last few years, Oxfordshire has really started to think about its long-term strategy, our position in the UK and our position in the world.

The Oxfordshire Industrial Strategy, completed last year as a joint work by Oxfordshire’s LEP, businesses, universities and public bodies, sets out a plan for Oxfordshire as the UK’s ‘Innovation Engine’ – reinforcing Oxfordshire’s strong contribution to the UK’s economy and to global innovation. The plans do this while addressing climate change and other environmental challenges, and delivering benefits for all of Oxfordshire communities, and all ages and abilities.

Now we are working on the Oxfordshire Plan 2050, which sets out the areas and conditions for development, and today’s main topic: the Local Transport and Connectivity Plan. Both have a horizon of 2050, thirty years in the future. Why? – well we are talking about major building and infrastructure projects at a time when technology is changing fast. We need to take a long-term view to make sure our plans are future-proof.

Let’s start by reflecting on where we’ve come from.
If we look back to 1952, when DfT first collected its statistics, we find people travelled more by bus than any other mode. Since then we have seen a huge rise in mobility, driven of course by the private car. We’ve tripled, from 2500 miles per person each year, to 7500 miles. On average, car use levelled off in 2002, and since then car travel is down a little and van use is up, delivering our online shopping.

Looking further down the chart you can see the gradual reduction of bus use down to 4% of our distance covered, but since the mid-90s a real surge in railways, now up to 10% of our mileage.
This growth comes at a price

- Traffic congestion
- Land use for roads and parking
- Road casualties
- Air pollution
- Climate change
- Physical inactivity

Affecting wider environment and health as well as solely users

That growth in movement has come at a cost. Wherever you are in the county, whether you drive or not, you’ll be impacted by the problem of congestion, interrupting your journey or your radio programme.

Cars and lorries also use a large amount of land, for roads and parking. That is particularly valuable in towns and cities.

For some unfortunately there is the direct impact of a road casualty.

Less visible, but several times greater in number are the people who get ill or die early because of traffic-related air pollution. [This is cause mostly by Nitrogen oxides and small particulates generated by petrol and especially diesel engines, but also by brake and tyre wear].

Another form of air pollution is carbon dioxide, and transport is both the largest and the slowest falling part of the UK’s greenhouse gas emissions. [It is 27% of emissions, and has only fallen 3% since 1990, while other sectors have fallen 51%].

And then there is physical inactivity. Public Health England puts one-in-six deaths down to a lack of physical activity, that’s the same as smoking. And it expects this to
get significantly worse in the next ten years.

So our appetite for private cars has had a profound impact on our health, both to those who use them and to those who don’t. It’s worth remembering that a quarter of households don’t have access to a car, two-thirds of those in the lowest income band.

Data and sources:

Road casualties: Average 1700-1800 deaths per year and 25,000 serious injuries. 800 in cars, 450 pedestrians, 350 motorcyclists, 100 cyclists, 100 in/on other vehicles. (DFT https://www.gov.uk/government/statistics/reported-road-casualties-great-britain-main-results-2018)

Air pollution is the biggest environmental threat to health in the UK, with between 28,000 and 36,000 deaths a year attributed to long-term exposure. There is strong evidence that air pollution causes the development of coronary heart disease, stroke, respiratory disease and lung cancer, and exacerbates asthma. (Public Health England March 2019 https://www.gov.uk/government/news/public-health-england-publishes-air-pollution-evidence-review). “The main source of PM is the combustion of fuels (vehicle, industry and domestic) and other human-made activities such as mining, quarrying, industrial processes and tyre and brake wear.” “Defra estimates that 80% of NOx emissions in areas where the UK is exceeding NO2 limits are due to transport.”


Physical inactivity: “Physical inactivity is responsible for one in six UK deaths (equal to smoking) and is estimated to cost the UK £7.4 billion annually (including £0.9 billion to the NHS alone). Unfortunately our population is around 20% less active than in the 1960s. If current trends continue, it will be 35% less active by 2030.” - Public Health England - https://www.gov.uk/government/publications/physical-activity-applying-all-our-health/physical-activity-applying-all-our-health

Car ownership: 24% of households don’t have access to a car, 65% of those in lowest 10% income do not own a car.
By income decile:
https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure/datasets/percentageofhouseholdswithcarsbyincomegrouptenureandhouseholdcompositionuktablea47
In Oxfordshire, we are already starting to address these problems. We really started this in 1973, taking general traffic out of Cornmarket Street and introducing the world’s first Park and Ride service. In 1999, Cornmarket was pedestrianised and bus filters were introduced.

Now the City and County Councils have been consulting together about plans to restrict traffic and emissions further, balanced with more buses and better cycling and walking routes.
Now let’s consider options for the future…

<table>
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<tr>
<th>Cars</th>
<th>Buses and Trains (Public Transport)</th>
<th>Cycling and Walking (Active Transport)</th>
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... and combinations of these

So what will transport of 2050 look like? Well, it won’t all be flying cars. Think about 30 years ago, the best selling car was the Ford Fiesta Mark 3, less sophisticated than today’s Mark 7, but still recognisable. And the buses and trains would be familiar if less comfortable. (The InterCity 125 has only just retired after 40 years of service).

For certain, cars will still be part of the future. But they will change in many ways and we’ll explore those is a while.

Buses and trains are important now, and will be even more important in the future.

And if we get active, we can get around and stay healthy, so cycling and walking both have a big place in the future too.

Plus, we’ll look at some interesting combinations.

Let’s start with how we might avoid transport altogether.
Connectivity

Why?

Replacing journeys with connections
• Home/Remote working
• Videoconferencing
• NHS plan: ‘video consultations a right by 2021’
• Virtual reality lets you be there

Optimising journeys
• Sat nav saves up to 16% mileage and 18% time
• Optimising delivery schedules
• Optimising autonomous and shared car services

How?

Full fibre broadband to every building for Gigabit speeds (1 Gbps = 1000 Mbps*)
• High-quality video on multiple channels
• Today 97% have 24Mbps but 10% full fibre

5G (+) Mobile for higher capacity and quicker connections, supplemented by satellites

OCC’s role:
• Enabling access to roads, wayleaves, lamp-posts, rooftops
• In Planning: new builds come with fibre, aim for ‘dig-once’ installing EV cables with fibre
• Plans for non-profitable rural networks

Mbps = Million bits per second.

But first, let’s look at the option of not travelling at all.
For the first time, our Local Transport Plan adds the letter C for Connectivity.

Connectivity allows people to replace journeys with communication, by working remotely, perhaps video-conferencing, seeing their doctor remotely or by 2050 by using virtual reality to see and operate things in their workplace wherever that might be as long as it is connected to the Internet.

It also allows us to optimise our journeys, whether that is you or me using a sat nav to find the right way; or a fleet operator using it to plan hundreds or thousands of deliveries across the country. In the future, this will be vital for getting the most out of self-driving and shared cars.

We’ll want two networks to deliver this.

First, a high capacity ground network of fibre optics cables to our doors, delivering all the data we can use.
Second, a high speed ubiquitous mobile network, currently being rolled out as 5G although what ‘G’ we are on in 2050 I won’t guess. And satellites have become a lot cheaper, so we might use those to fill in the gaps.
The County Council has a key role helping the telecom companies to lay their networks along our roads, accessing other properties and putting equipment on our lamp-posts and buildings. We are trying to minimise disruption, so fibre should come as standard with a new house, and we are trying to think ahead when the roads are dug up. And very important to us is that these networks should reach everyone, so we are looking at ways to fund or deliver the rural connections that would not be commercially viable.

Images: Cisco, TechCrunch/Meedoc, Future of Work, Satellite Today
Cars of the future will be increasingly…

| Electric       | • By 2035 no petrol or diesel cars can be sold  
|                | • But electric cars still need electricity  
|                |    … and brakes, tyres, manufacturing  
| Connected      | • Part for navigation, part for entertainment  
|                | • But mobile coverage misses 20% of  
|                |    Motorway/A-roads and 30% of B-roads  
| Autonomous     | • Optimists say 2025, pessimists say 2040, or  
| (Self-driving) |    never  
|                | • In reality it is coming in stages, easy ones  
|                |    first  
|                | • This could be most important of all…  

Now to transport, and a big question: What will the car of the future look like? It will almost certainly be electric. We have legislation to ban sales of new fossil fuel cars, advanced this year to 2035. Battery technology is improving and the big challenge is when and where you charge up. Hydrogen is another possibility, but more likely for trucks and trains than for cars. Electric cars don’t solve congestion and do have environmental impacts though.

It will be connected. Many new cars are connected today, with phones and navigation, and these capabilities will increase. We still have many roads without mobile coverage and even if satellites close the gap you’ll want your self-driving car to be ok if the signal drops. But the main use of these connections may be to download videos while the car drives on.

So when will your car be driving itself? We already have smart cruise controls, lane assist and braking systems. Waymo, Google’s sister company, achieves 11,000 miles between manual takeovers. But there is a big difference between motorway conditions and a country lane with passing places and the occasional cow. So expect step-by-step developments.

Which brings us to sharing, which could be the most important of them all.
Cars: Why is sharing so important?

No car sharing

- You have your own (autonomous) car
- It's free at point of use (like today)
- It's cheaper to run (electric)
- It's even more convenient (self-driving)
  - No need to park, just let it circle

- Even more trips by car
- Even more congestion
- Even less exercise

With car sharing

- You summon a car from a ‘pool’ when you need it, with an easy-to-use app
- Pay-per-ride (but cheaper overall)
- Still convenient, but a decision each time on whether to travel and options e.g. bus or cycle

- Fewer trips by car
- Fewer, smaller cars needed in the pool
- Regain street space from parking
- Gentle reminder to exercise
- More on this later

Why is sharing important?

Let’s think about what happens with no car sharing, which is mostly the case today. People have their own car, or about three-quarters of households do – less at lower incomes.

It sits there idle 95% of the time and feels free to use, just like today.

It is actually cheaper to run, because it is electric.

And it’s way more convenient because you don’t have to drive it, or park it. So we can jump in, tell it where we want to go and keep doing our work, chatting to our friends, watching videos, or whatever we want.

So we’ll make more trips because it is cheaper and more convenient.

And we won’t mind being stuck in a traffic jam, because we’ll have something to do. So there will be even more congestion. And we’ll be even less likely to cycle, or walk, or to walk to the bus stop.

Some industry experts call this ‘the Hell of autonomous vehicles’

So now let’s look at the ‘Heaven’.

This is where instead of owning a car, we summon one from a pool when we need it.
We might have one or two waiting at the end or our street ready at a minute’s notice and then a larger pool in a car park a mile away. Most of the cars would be one or two seaters, but there would be six-seaters or vans to carry a bigger load.

We’d pay per ride, but because we are not paying the full cost of owning and maintaining a car, it would work out cheaper in total. And this would nudge us into considering the options each time. It’s like the plastic bag charge – 5p isn’t much, but we are using 86% fewer single-use plastic bags.

So by 2050 we’re taking fewer trips by car. Because we are sharing, we need fewer cars and most of those can be small because we can access a big one when we need to. We don’t all need cars parked in our garages, drives, streets and pavements and can reclaim that space to do something nicer with. And we get a gentle reminder to do our 150 minutes a week of moderate physical exercise. And all this saves a lot of greenhouse gas.

Reality will probably be a mix of these two models. Car sharing will work best in dense areas, and there will be some people who want their own car. How do you think the future might turn out?

Sources:
https://www.citylab.com/transportation/2014/04/will-world-driverless-cars-be-heaven-or-hell/8784/
(Note there is some recent concern about increases in sales of multi-use plastic bags).
Buses

**Recently**
- Government’s new plan for a National Bus Strategy and increased funding
- Better buses: disabled access, contactless payment, more comfort, information, Wi-Fi
- Lower emissions with Hybrids and Euro 6

**By 2050**
- Electric buses – Oxford bidding to be the first all-electric bus city
- Autonomous buses? Maybe short-distance shuttles
- More Bus priority measures – Bus Lanes, Bus-only routes, traffic reduction
- Better signs, information and bus stops
- More multi-operator/multi-modal ticketing
- On-demand services – between bus and taxi
- Rural services – the big challenge

Now let’s go from shared cars, to even bigger shared vehicles: buses. You may have noticed that buses have steadily been getting better. They are easier to get on, and to pay, and you even have Wi-Fi.

As we head towards 2050 we’ll see further improvements.

We’ll see electric buses. Oxfordshire’s bus companies are already planning for fully electric buses in the city and by 2050 that might extend across the county. Maybe we’ll see driverless buses, at first for short-distance shuttles – say from Oxford station to the centre.
We’ll see more priority for buses over general traffic, with bus lanes and filters. And better bus stops perhaps, with more signs and information to help people find their way to and from the bus.

Building on the existing Smart Zone, we’d also expect more multi-operator ticket options maybe combining rail too.
‘On Demand’ bus services fill the gap between bus and taxi, like Oxford Bus Company’s ‘Pick Me Up’ trial. If this proves successful, similar services could expand.

But the big challenge is in rural services, which are hard to make economic without
subsidies. Central Government promises a new National Bus Strategy and funding, which could change the picture. Smaller vehicles and innovative approaches such as community services, booking apps and better connections for cycling and walking may also help. All these need to be explored.
Trains

**Recently**
- New GWR trains and electrification to Didcot
- Oxford Parkway and Chiltern service to Marylebone

**By 2050**
- Decarbonisation: More electrification. Hydrogen?
- East West Rail
  - Milton Keynes – Bedford (2023)
  - Cambridge (Late 2020s)
- Heathrow Western Rail Link
- Cowley Branch Line?
- New stations
  - Grove (Wantage)?
  - Begbroke?
- Revamped Oxford station and bridge
- Longer / more frequent trains
  - Oxford-Banbury-Birmingham (connect to HS2?)
  - Bicester-Oxford-Didcot (4 tracks?)
  - North Cotswold line

Railways invest for the long-term, so 30 years is a normal investment life for them. Even though the tracks and trains of 2050 may look familiar we can look forward to some very significant developments.

Like Cars and Buses, the Railways will be decarbonised, either by electrification or hydrogen power.
By then, East-West Rail should be open all the way from Oxford to Cambridge, via Bicester, Milton Keynes and Bedford.
We’ll have a new connection into Heathrow, from the west.
The Cowley Branch Line could be re-opened, with stops at the Oxford Science Park and Business Park, easing the journey for hundreds of commuters.

We could have new stations at Begbroke and Grove, both places where business and housing are growing.

Oxford’s own station is due for a major redevelopment and plans are in the works, so very likely before 2050. An early part of this is to replace the bridge over Botley Road with something wider.

The final piece is about increasing capacity to meet demand. For trains, that means
more frequent and longer trains, making Oxford an increasingly important railway hub.
As well as people, we also need to move Goods: our food and the products we use or keep in our homes and workplaces. Freight moves on many scales, each with its own challenges.

Oxfordshire is on the main route for freight heading from the port of Southampton to the north, both by road and rail. Both are congested and we face choices about where we expand capacity which will encourage more freight traffic.

Lorries of various sizes are the standard way to move things around the county. By 2050 we may see electric or hydrogen motors. But autonomous self-driving will be the big disruptor because it enables trucks to be mobile 24/7 without concern from driver tiredness. That reduces costs, but it will could change the timing of deliveries and unloading practices considerably.

At the local end, planning for delivery is essential: Brian Deegan, respected for excellent cycling and walking schemes in London and Manchester, says he designs for freight first – otherwise the cycle and foot ways will be blocked by trucks that need to unload somewhere.

Emissions and congestion are already driving people to look at smaller solutions for local delivery. We have bicycle delivery and electric vans. Some are talking about
drones – we’ll have to decide if we want these flying around with our packages. Or maybe an autonomous van will roll up with a robot postman? Serious? Mercedes-Benz and Ford think so.
Now we switch from the big end of transport to the most basic, walking. For decades, walking has been pushed to the side of the transport agenda, and to the side of our streets. Now, we need to reduce motor traffic in our public spaces, and this frees up space for people.

This can happen in small residential streets, turning rat-runs into what we call ‘low traffic neighbourhoods’. It happened almost by accident on Walton Street in Oxford, and now residents are delighted with their quieter, cleaner air. They can still access the street by car but they don’t have the through traffic to contend with.

We can take this to bigger spaces as well. Imagine what St Giles or Broad Street could be as public spaces with fewer, or no, vehicles for most of the day.
Cycling like walking is a clean and healthy way to get around, but it multiplies your range by 4. You’ll know the Netherlands as the home of mass cycling, but did you know that Germany now has five times as much cycling as the UK? And Germany is not flat! Closing even half the gap to Germany would make a huge difference to our towns’ traffic congestion and our health through reduced air pollution and increased exercise.

We know how to design cycle routes that will attract mass cycling – there are 5 rules that the Dutch learned over the years.

We have started a process of developing the plans. Oxford is done, and Bicester and Didcot are on the way. Other towns and a network of routes and Greenways to join the towns will follow.

The challenge is to secure the funding. Some of this we can get from developers if we put adequate requirements on them. Most of it would have to come from central government one way or another.

2050 seems a reasonable target to complete a county-wide network linking the major towns.
Finally, let’s bring this together and imagine planning a journey in 2050. This is what people are calling ‘mobility as a service’ and there are lots of new businesses setting up to make different parts of this experience. So some of this is available today, and it starts a bit like your sat-nav.

Let’s say you want to go from Oxford to your home in Eynsham. Then it gives you 4 choices.

• You can rent an electric bike. That’s the cheapest but slowest option, but it does tick off your exercise requirement for the day.
• You could take the bus, for a bit more money and a bit less time. Walking to and from the bus stop gets some of your exercise done.
• Next up is a shared taxi. Quicker, but you might have someone else in the car.
• Finally, your own car, paying the premium for privacy and speed.

So you have the choice, and it is all made as convenient as possible. Whichever you click, you can then make a payment, it books your place and guides you to the bike, bus stop or taxi.

And on a much bigger scale, we have the choice about how we design our public places and our transport policies for the next thirty years, which will determine what kind of heaven or hell we arrive in.
And who knows, by 2050 maybe you will be able to choose a flying car as well...