Economic evaluation of urban regeneration schemes in the investment context

Case Study of Manchester Mayfield Park

SEPTEMBER 2025

TRUUD

Licensing and attribution

Cover image: Mayfield Park by Richard Bloom

UKPRP Prevention Research Partnership Joint action for a healthier, fairer future

Local authority partners

GMCA Greater Manchester Combined Authority

Bristol City Council

University consortium

University of Bath

University of Bristol

The University of Manchester

University of Reading

University of Stirling

UWE Bristol

About this Report

This report summarises the approaches, data, results and recommendations for a Health Impact Appraisal for the Mayfield site in Manchester, based on plans put forward by the investor, Landsec U+I, in 2024. This report aims to explore how health outcomes such as cancers, diabetes, respiratory illness and mental ill health might be affected under the plans, compared to alternative development scenarios for the area. The purpose of this report is to help the research team explore with real estate investors how to improve methods to consider health impacts in decision-making for urban development schemes. This work forms part of the five-year TRUUD research initiative to Tackle Root causes upstream of Unhealthy Urban Development' (www.truud.ac.uk) (Black et al., 2022).

The project team from TRUUD comprises Eleanor Eaton[1], Nalumino Akakandelwa[2], Kathy Pain[3], Oliver Tannor[4]

Funding statement

This work was supported by the UK Prevention Research Partnership (award reference: MR/5037586/1), which is funded by the British Heart Foundation, Cancer Research UK, Chief Scientist Office of the Scottish Government Health and Social Care Directorates, Engineering and Physical Sciences Research Council, Economic and Social Research Council, Health and Social Care Research and Research and Development Division (Welsh Government), Medical Research Council, National Institute for Health Research, Natural Environment Research Council, Public Health Agency (Northern Ireland), The Health Foundation and Wellcome.

1 University of Bath
2 University of the West of England, Bristol
3 University of Reading
4 University of Reading

Executive Summary

Background

The TRUUD real estate investment intervention research team was led by Kathy Pain, Professor of Real Estate Development at the University of Reading. Urban regeneration schemes have the potential to address a wide number of health inequalities through urban design. This case study explores methodologies for quantifying the health impact of investments in an urban regeneration scheme and how data derived in this way could inform investor decision making on health.

Methods

The team applied a comparative assessment model; Health Appraisal for Urban Systems (HAUS) to quantify effects of the urban environment using the impact-pathway method. Collaborating with the development scheme investment partner, Landsec U+I, we developed five scenarios exploring the impact of the environment at different delivery phases of an urban development scheme in Manchester, UK. Modelling for a population of 8,000 residents and up to 10,000 commuters, who might experience change through their use of the site, we estimated attributable changes to health incidence including non-communicable disease, premature mortality, physical activity and weight gain, and the societal costs associated with these health outcomes.

Findings

We find that the quality of environmental conditions in the area meant residents living within 300m of the site may formerly have had higher than average risks of chronic, long-term disease and poor incentives to activity and active travel. Compared to the minimum standards set out within local plans for the area, the scheme represented by the emerging Strategic Regeneration Framework (SRF) could provide an additional £234 million of health economic savings over 25 years. The SRF could mitigate existing health risks by reducing premature mortality, encouraging activity and could help prevent chronic diseases such as diabetes and bring additional benefits by improving mental health, wellbeing and life satisfaction. Benefits are likely to extend to communities outside the regeneration area and to non-residents using the site for work or leisure. However, additional measures outside the project scope, could improve health further by reducing levels of air pollution.

Interpretation

Investment in health can bring valuable benefits beyond the boundaries of a specific site, enabling decision makers to understand more about the specific health inequalities of an area and how these might be addressed through urban design measures. This provides benefits for the investor as well by not only monetising health-related benefits, but also indicating the extent to which investment proposals or holdings exceed local authority minimum planning requirements. There is growing evidence suggesting that investors desire to positively impact local communities through delivering social value but have lacked the metric by which they could demonstrate their impact beyond conforming to minimum requirements. Modelling indicates that a health informed approach brings many potential benefits for the community, especially in relation to long term, chronic health indicators such as inactivity, obesity and premature mortality. Effective, timely access to information for decision makers can improve how health is considered against other priorities in urban investment.

Source: Mayfield Park by Richard Bloom

Contents

List of Figures

List of Tables

List of Appendices

Source: Adobe Stock (Bardhok)

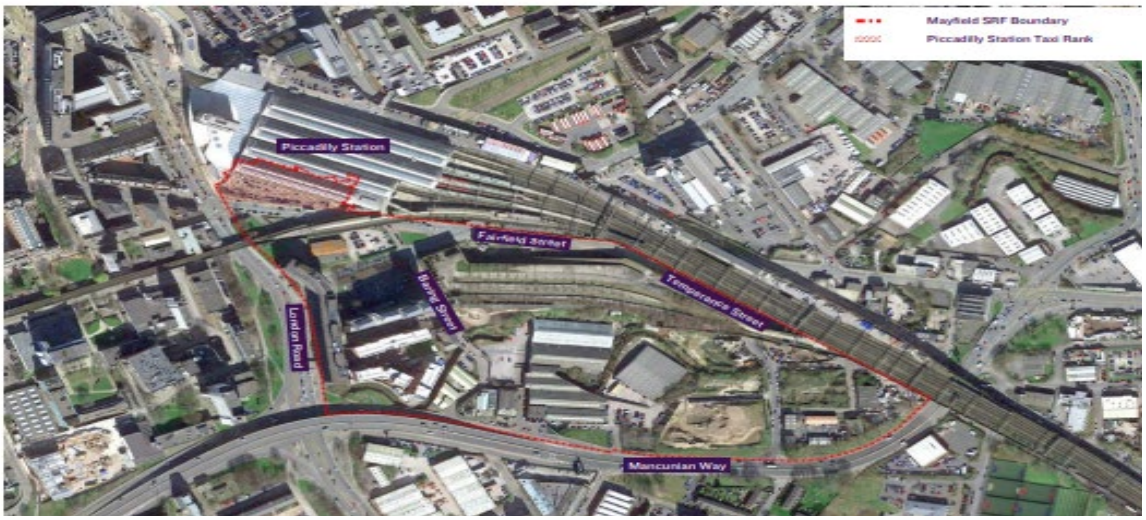
1.0 **Introduction**

The Health Appraisal of Urban Systems (HAUS) economic valuation model was developed to help decision-makers quantify and value the attributable health impacts of development scenarios. It provides more detail of health outcomes than previous tools, considering 30 environmental characteristics including noise, air quality, transport, food environment, crime, flooding and internal building conditions. This overcomes limitations of previous tools to enable a place-based approach for health impact appraisal. In this case study, the HAUS model is applied to further explore the capacity of the model in an investment, rather than public policy making context, and where the site has in part already been developed, and where because the site was derelict for many years, a baseline is harder to establish.

1.1 About Mayfield

Mayfield is a 9.7Ha. area adjacent to Manchester Piccadilly station in central Manchester city. It is bordered by some major roads: Fairfield Street to the north; Temperance Street to the north-east; the Mancunian Way Ring Road (A635) to the south; and London Road (A6) to the west. A significant section of the northern part of the Mayfield area is occupied by the Mayfield Depot building and associated railway infrastructure, which was formerly in use as a passenger railway station, and latterly as a Royal Mail depot (Mayfield Partnership, 2018). Part of the site also includes the Piccadilly Station taxi rank. Therefore, the site is adjacent to a major transport hub for the city. The site also includes the River Medlock, as well as a mixture of buildings, including warehouses and car parks.

Figure 1: Mayfield site boundary - 2018



Source: Mayfield Partnership, (2018)

Two earlier SRFs in 2010 and 2014 set out a vision for the regeneration of the Mayfield area to create a new neighbourhood for the city. In December 2016, Landsec U+I was appointed as the preferred development partner to bring forward regeneration of the site. Following this, a revised SRF was drawn up for the site in 2018 (Mayfield Partnership, 2018). This vision for the regeneration of the site included the reuse of the Depot, 1,500 new homes, office space, retail, bars, hotels and a new public park as well as improved connections with the communities of Ardwick and East Manchester. The SRF was adopted by Manchester City Council (MCC) as a material consideration for planning policy in 2018.

The delivery of the masterplan was proposed in five phases, with the first being the delivery of Mayfield Park, key connectivity and some residential development. Following this, distinct quarters of the site would be developed. To date the park has been delivered, with consent granted for a large new cycle hub (400 bikes) and two office blocks in 2023 (Landsec U+I, 2023). Mayfield should be considered in context with several other overlapping or nearby regeneration schemes, and within the context of Manchester City Council's ambitions for the city, such as the Streets for All policy (Greater Manchester Combined Authority, 2024b).

1.2 Research Questions

This research seeks to provide insights on health for the Mayfield Park scheme, Manchester, by modelling the health impacts of the environment of the site. To achieve this, the following research questions arise:

- What was the likely impact on the health of people living within a 300-metre radius of the environmental conditions at the Mayfield site before work started in 2016?
- How might the proposals for redevelopment of the site change health? What does the strategic approach offer in addition to minimum policy aspirations for the site?
- How useful is the approach for informing site development decision-making and investment appraisal?

2.0 **Methods**

We carried out a desktop analysis of health impacts of environmental changes for the Mayfield development site. This took the form of a comparative assessment of alternative scenarios for land use, based on assumptions which were agreed and co-designed with the Landsec U+I team. Modelling was carried out to explore effects on three separate cohorts: Residents within the site boundary, residents within 300m of the site boundary, and non-resident commuters to the site.

2.1 Data Collection

Data were collected by members of the TRUUD team with the support of the Landsec U+I team, who provided data and links to documents around future plans for the site, mainly relating to planning applications for various phases of the site development. This was combined with a site visit, information on demographics of populations in the areas around the site, as well as additional published literature to establish baselines on underlying conditions such as noise and air pollution.

2.2 Estimation: About the HAUS model

Attributable changes to health were modelled using the Health Appraisal of Urban Systems (HAUS) model (Eaton, Hunt and Black, 2023). The HAUS model is a comparative risk assessment model. The user sets assumptions for a Baseline state (See Appendix 1), and then up to four alternative scenarios, considering current and future environmental conditions of the site and its surroundings. The model uses local information about people's demographics, behaviours and perceptions of the area, alongside nationally derived information on health risks. Health costs are estimated from the perspective of societal value of health, incorporating direct, indirect, and intangible costs of ill health, based on national average costs.

The application of the HAUS model explores the potential health outcomes which could be a consequence of alternative conditions to help inform decision making about planning for an area. It does not address the plausibility or viability of the framework and does not estimate benefit-cost appraisal of any option. However, we hope to learn how the approach might be developed in future to inform investment appraisal and we want to test whether the findings using this approach could influence decision making in this context.

2.3 Key Parameters and Assumptions

Key items	All scenarios
The resident population of the site within the site boundary	3,000
The total resident population within 300m buffer of the site boundary	5,000
Non-residential users of the site	10,000
Leisure users	Unknown
The expected lifetime of the project for modelling	25 years
Reference Lower Super Output Area (LSOA) or areas in which the site is located	Manchester 055E - E01033661

2.4 Modelling Assumptions

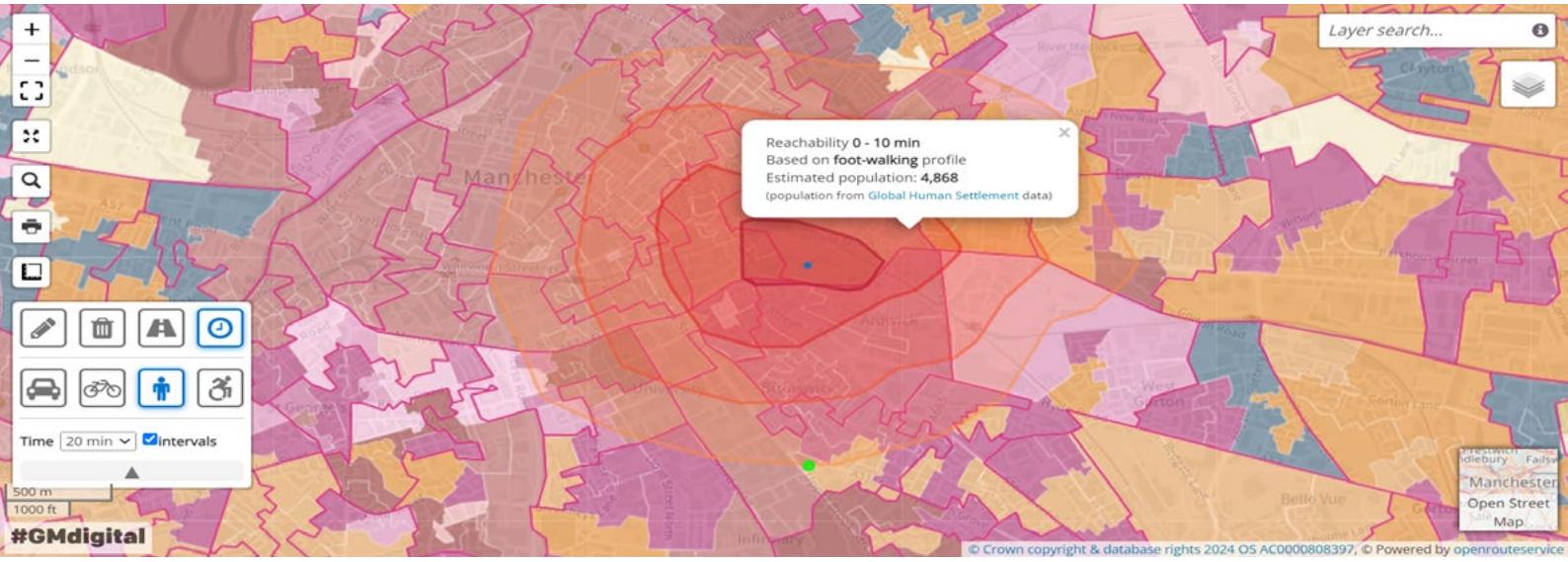
Resident population

The key challenge for Mayfield is that the site today is comparatively unused. Therefore, we have two changes to make – for existing populations living on or near the site, the benefits they might experience through improvements in conditions. Secondly, for populations moving onto the site through new usage and new homes, the benefits for these individuals of experiencing the new site, compared to either where they lived before, or what else could have been done with the land.

The Mayfield site falls under the Piccadilly and Ancoats Middle Super Output Area (MSOA) (E02006912), with most of the site and Mayfield Park itself within Manchester 055E - E01033661 Lower Super Output Area (LSOA). In 2022, according to ONS data, there were 2,217 people living in this LSOA (Office for National Statistics (ONS), 2024b). In the index of multiple deprivation 2015, this LSOA was in the 3rd decile (1 being worst) (Department for Communities and Local Government, 2015).

The image in Figure 2 below, taken from the Mapping GM (Greater Manchester) website, shows populations within walking distance of the park – estimated here to be around 700 within 5 minutes, 4,868 within 10 minutes' walk (300-metre buffer) and 33,000 within 20 minutes' walk (Greater Manchester Combined Authority, 2024a).

Figure 2: Population within Walking Distance to Mayfield Park 2024



Source GMCA (2024a)

To understand health changes under differing land use conditions, a single static population was modelled, so that it is easier to understand relative changes to health due to alternative environmental conditions in altering scenarios. A static population of 3,000 residents was assumed to live within the regeneration area, and a further 5,000 residents within a 300-metre buffer outside the area. In addition, 10,000 people are expected to use the site for work. A total of 8,000 residential and 10,000 non-residential users may therefore experience health changes dependent on land use at Mayfield. Population demographics are based on the spread of ages and genders for the Piccadilly and Ancoats MSOA, and life expectancy is based on the average for Manchester (ONS 2024a). This synthetic population is likely to be younger and healthier on average than some of the existing communities adjacent to the site, as there is some variation between communities at the LSOA level. For example, the population of Piccadilly and Ancoats MSOA is dramatically different to that of Ardwick MSOA – appearing to represent a population of young working age adults, compared to a more evenly distributed spread in Ardwick with more families and older people.

Economic valuation of health outcomes

The lifetime of the project was set at 25 years, assuming environmental parameters applied in the model are consistent for this period. Estimation of health effects was limited to incidences of disease or health related behaviours that might occur during the project lifetime and was calculated using the method applied in Eaton, Hunt & Black (2023). There is a lag of 5 years before any full health effect is realised (Kahlmeier et al., 2011). Net present value (NPV) of monetised health changes is estimated at a discount rate of 1.5% (HM Treasury, 2022).

Health impacts are valued by applying a societal unit cost of illness, expressed in GBP £ 2024. Societal costs of illness incorporate direct and indirect costs and valuations of disutility associated with ill-health. Direct costs include the costs of medical and social care. Indirect costs include lost productivity, including valuation of informal care, and other costs, for example out of pocket expenses, education, crime and criminal justice services. Disutility costs include monetary valuations of pain and suffering associated with illness and premature death. Modelling was carried out using HAUS (standardised unit costs version 14.33), which uses a standardised version of assumptions for simpler modelling. See Appendix 1 for how assumptions were applied using this standardised approach.

2.5 Scenario Development

A set of five (5) scenarios was developed for testing; key features of these are summarised below.

Table 1: Mayfield Park Scenarios for Health Impact Analysis

Scenario name	Key features for testing
Baseline	Pre-development: Baseline conditions and health of population at 2016 (before any work began)
Comparator	Expected conditions as a result of minimum policy aspirations as set out in the local plan and other relevant local planning policies
Post- Park Completion	Reflects conditions on site as of summer 2024, when the main part of Mayfield Park had been delivered, but new housing and offices were not yet in place.
Strategic Regeneration Framework (SRF)	Full completion of site masterplan as in current Strategic Regeneration Framework(SRF)
Ideal	A hypothetical scenario, which tests the impact of further improvements to conditions beyond that set out in the SRF

A further scenario, “Emerging SRF”, was discussed with the team, but could not be modelled in the final report due to lack of data. A full list of assumptions is detailed in Appendix 1. We summarise key conditions below:

Scenario A: Baseline conditions

This scenario replicates conditions as they were in 2016, before work began on redeveloping the site. In December 2016, much of the site was derelict, and had been largely unused since the 1970s (Mayfield Partnership, 2024). Much of the open space on the site was of poor quality, including open ground and unmanaged vegetation (Mayfield Partnership, 2018), p104). Although there was no residential use within the site boundary, the site is close to a dense residential area in Ardwick Green (Mayfield Partnership, 2018, p100). The 2018 SRF found that the site had permeability barriers, including an “inhospitable” and “uninviting” environment for pedestrians, creating a sense of detachment and isolation from the city centre (p108). Given its’ location near main roads, levels of noise and air pollution are expected to be high (Jephcote et al., 2023; Extrium, 2024). This scenario assumes homes are built within these conditions, with no improvement to public realm or development of derelict buildings. The site is located within walking distance of a large shopping area, so the food environment is expected to be around average for the UK urban context (University of Cambridge, 2017).

Scenario B: Comparator

This scenario provides a notional Baseline for the purposes of assessing the additionality or material benefit which the plans under the SRF for the site bring, compared to what might have happened otherwise. Assumptions are derived by estimating the type of minimum standards with which any investor-developer would have to comply. The scenario considers that the development would meet the minimum requirements set for such developments by the Manchester Local Plan (Greater Manchester Combined Authority, 2024b).

This document does not specifically describe ambitions for the Mayfield site, except to say that a new park should be provided on the site. However, as a City Centre site, the area falls under ambitions to develop brownfield land for high density housing and office use, consistent with minimum standards for housing space, and Streets for All ambitions to improve walking, cycling and public transport use in the city so that by 2050, 50% of all journeys in Manchester are made by one of these modes. Therefore, this scenario includes improvements to walking and cycling infrastructure, and the provision of a new park, assumed to be of average quality.

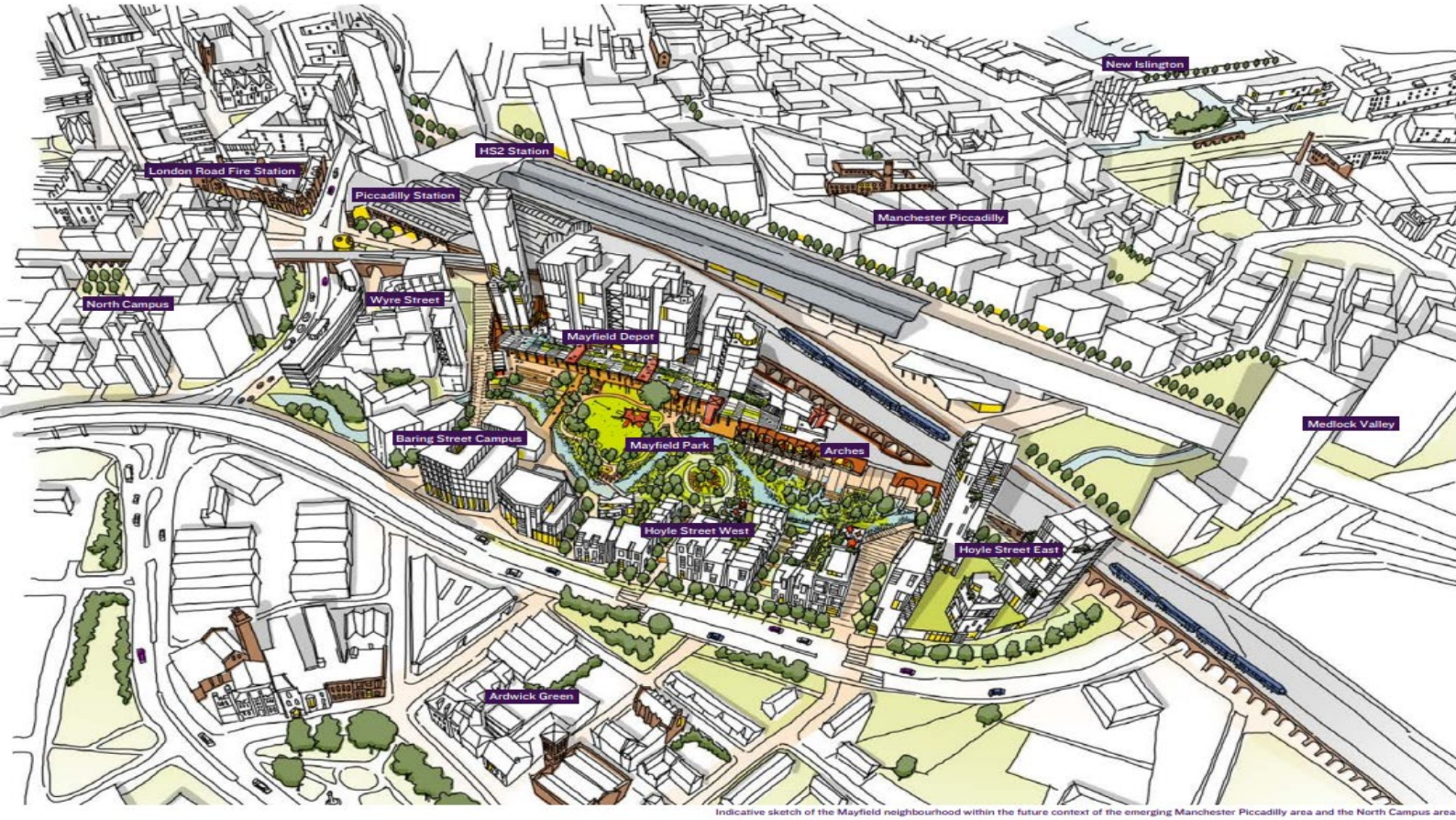
Scenario C: Post-Park Completion

This scenario reflects changes in the site consistent with progress so far in summer 2024, relating to completion of the Mayfield Park phase only. Changes here are assumed to relate to the introduction of a new park for the city, with additional road and river crossings, walking and cycling infrastructure, destination spaces, improved public realm and public amenity (Mayfield Partnership, 2018). The creation of the park also included specific measures to reduce flood risk, in particular, a wetland area. The park itself is assumed to be of very high quality in terms of biodiversity. Plans introduce 1.22 ha of new habitat through a broadleaved woodland establishment comprising 155 new trees and semi-improved neutral grassland (for foraging, commuting and roosting bats, breeding birds and invertebrates (Deloitte, 2019)kah. As part of this first phase of development, the Depot was also brought back into use, providing new retail and leisure opportunities. Although the reuse of these buildings may bring additional social and economic benefits for the city, this study takes a health perspective, so effects from the redevelopment of this space are only modelled in relation to improvements to the perceived safety of the area through bringing a previously derelict area into use. Some areas of the site remain undeveloped, however, as these will be developed in the next phase of work.

Scenario D: Strategic Regeneration Framework

This scenario anticipates changes to health as a result of the plans set out in the 2018 SRF (Mayfield Partnership, 2018). This builds on development in Scenario C to include a diverse range of uses aimed at creating a city district that is in 24-hour use. The SRF (See Figure 3 below) supports a mix of uses including offices, new homes, hotels, cafés, bars and retail as well as a reworking of the Piccadilly Station viaduct to accommodate speciality markets, retail, arts and performance. Office and residential blocks will be designed to minimise noise annoyance, and additional changes made to the permeability of the site and transport connections. Overall, the redevelopment of the area might be expected to improve the deprivation score for the area given its scale. Despite these changes, it is assumed that increased usage does not have a material impact on noise or air pollution levels (Deloitte, 2023).

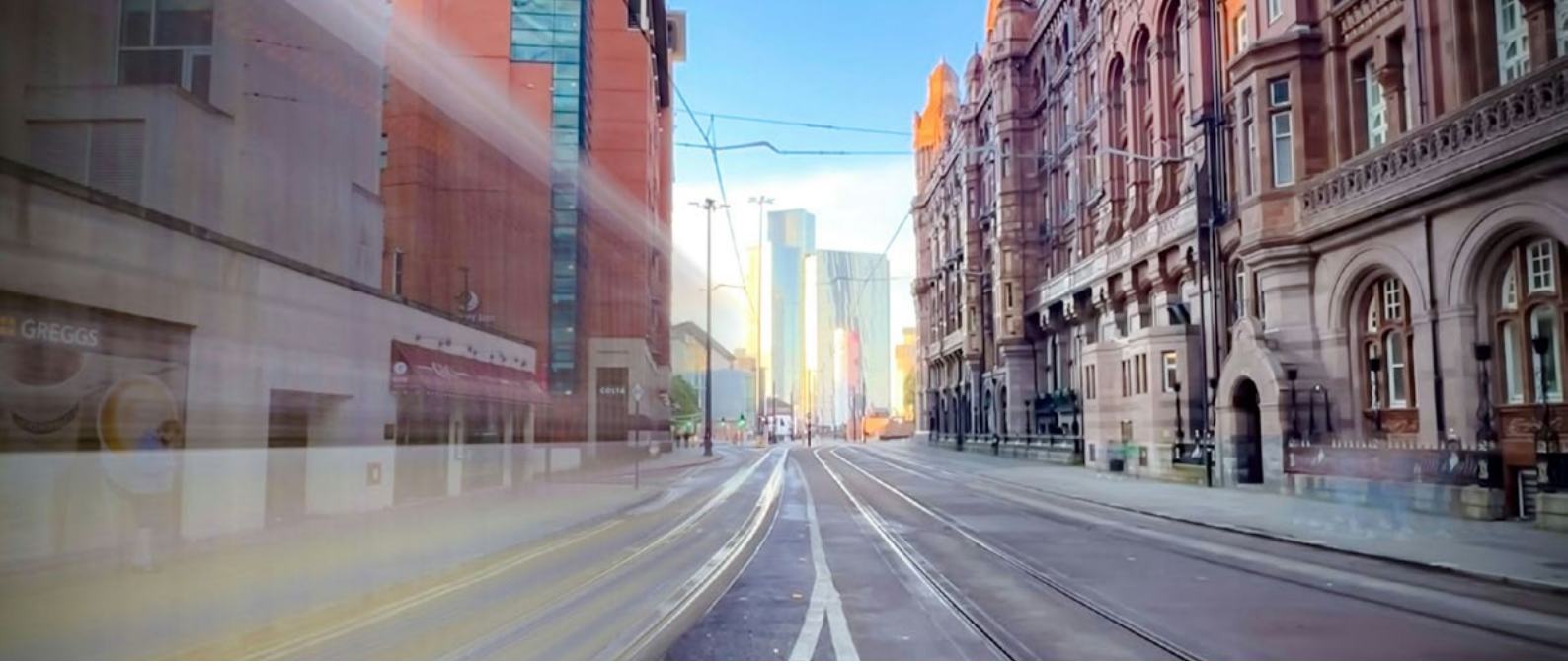
Figure 3: Illustration of Mayfield site following SRF completion



Source: Mayfield Partnership (2018)

Scenario E: Ideal

This scenario tests measures outside the current project scope for maximum potential health effects. It is not intended to reflect any measure currently planned by the investment partners, but as a comparator to inform understanding about further methods to improve health. We do not comment on the cost or viability of these measures. The key feature of this scenario explores additional measures to reduce air pollution through the downgrade of major roads.



Source: Jonny Gios, Unsplash

3.0 **Findings**

3.1 Summary of results

The HAUS model allows the user to build a picture of how the SRF approach could mitigate existing hazards and add health benefits compared to baseline conditions. By monetising health effects, the magnitude and direction of characteristics of the urban environment can be compared. Results are summarised in the table below. Table 2 below compares the value of attributable changes to health in terms of averted health costs, and summarises estimated value of changes to health related to the environment in each of the five scenarios.

Table 2: Summary of attributable changes to health by population group under each scenario (£ million)

Population	N	Baseline	Comparator	Post-Park	SRF	Ideal
Within Site Boundary	3,000	89.64	71.57	-28.41	-68.05	-90.96
External to site boundary	5,000	76.09	54.26	-39.92	-39.92	-39.92
TOTAL	**8,000**	**165.73**	**125.83**	**-68.33**	**-107.97**	**-130.88**
Commuters	10,000	-11.96	-34.24	-107.45	-107.45	-107.45

Benefits estimated over 25 years £million
(Negative values indicate reductions in health costs, positive values indicate potential additional health costs)
Values in £2024, NPV (Net present value of health changes) adjusted for 1.5% discount rate

Modelling only relates to changes in health outcomes. We are not, therefore, able to comment on wider changes to economic and social outcomes, for example, employment, educational attainment, to mention a few. Values are given in terms of the net societal cost of health attributable to the urban environment – therefore positive values represent additional health costs, whereas negative values represent averted health savings.

Modelling indicates that if homes and offices were built in existing conditions as today, conditions on site could increase health risks, at a cost of around £165 million over 25 years. The conditions imposed by the local plan aspirations for the site (Comparator) indicate that these health risks would be mitigated significantly, reducing health costs for residents in and around the site by a total of £40 million over 25 years, or £1,369 per person per year (Table 3). However, the large part of some major risks to health such as air/ noise pollution and flood risk remain. The Post-Park and SRF scenarios demonstrate the additional benefits of changes brought by the Landsec U+I plans, revealing how the site conditions could provide additional net improvements in underlying risks to health, often demonstrating the movement from average to good conditions.

Table 3: Net change to health by population group under each scenario from Baseline (£ million)

Population	N	Baseline	Comparator	Post-Park	SRF	Ideal
Within Site Boundary	3,000	-	-18.1	-118.1	-157.7	-180.6
External to site boundary	5,000	-	-21.8	-116.0	-116.0	-116.0
TOTAL	**8,000**	**-**	**-40**	**-234**	**-274**	**-297**
Commuters	10,000	-	-22.3	-95.5	-95.5	-95.5

Benefits estimated over 25 years; (Negative values indicate reductions in health costs, positive values indicate potential additional health costs); Values in £2024, NPV (Net present value of health changes) adjusted for 1.5% discount rate

How each scenario affects each population group is different, so in the next section we explore these changes by population group in turn. We have summarised characteristics of the urban environment into the broad categories used by the HUDU tool (NHS London Healthy Urban Development Unit, 2017).

3.2 Health for residents within the site boundary

Baseline

Results in Table 4 below indicate that significant hazards to health could exist in this location if the development had proceeded with conditions as in 2016. The largest risks are from noise pollution, and poor air quality, which might be expected given the location of this site adjacent to main roads in the centre of the city. However, increased flood risk may also be a significant problem, due to the river running through the site (JBA consulting, 2011). This brings increased potential risk of mental and physical health problems associated with flooding in the home, for example increased mortality, depression and chronic pain.

Table 4: Baseline impacts and future scenarios compared - residents within boundary (£ million)

Environmental Category	Baseline	Comparator	Post-Park	SRF	Ideal
Access to open space and nature	-8.89	-10.07	-66.58	-66.58	-66.58
Air quality, noise and neighbourhood amenity	61.02	61.02	39.51	39.51	16.60
Accessibility and active travel	0.08	-12.13	-12.13	-12.13	-12.13
Crime reduction and community safety	1.39	0.82	-0.14	-39.78	-39.78
Climate change	36.05	31.93	10.92	10.92	10.92
TOTAL	**89.64**	**71.57**	**-28.41**	**-68.05**	**-90.96**
CHANGE FROM BASELINE	**-**	**-18.07**	**-118.05**	**-157.69**	**-180.60**

Benefits estimated over 25 years; (Negative values indicate reductions in health costs, positive values indicate potential additional health costs); Values in £2024, NPV (Net present value of health changes) adjusted for 1.5% discount rate

High levels of traffic related noise in the baseline are expected to affect older adults, especially relating to functional loss and activity, and depression. In all adults, noise may result in increased risk of premature mortality. Children are affected too; elevated noise may increase risk of emotional problems and conduct disorders in children. The most costly effect is a risk of sleep disturbance, which might affect up to one fifth of residents. This could be mitigated through building design.

Air pollution affects serious long term health conditions in adults such as cancers, diabetes, Parkinson's disease, and premature mortality (risk of premature deaths may be increased by around 6% due to air pollution). One of the largest impacts here is on risk of diabetes. Air pollution also affects children, resulting in asthma and other respiratory outcomes, and increased mortality risk also.

There is a small amount of green space within walking distance of the site, which may bring some health benefits, through encouraging some activity and active travel. However, overall, the total impact on health of the environment would be emphatically negative. The total NPV of impacts to health in the baseline, Table 4 above, are estimated at £90 million over 25 years (Range £62 million to £282 million[5]).

Future scenarios

Table 5 explores how each future scenario compares with the baseline by describing the net value of changes to health in terms of averted health costs.

Table 5: Net value of health impact compared to Baseline - residents within boundary (£'million)

Environmental Category	Comparator	Post-Park	SRF	Ideal
Access to open space and nature	-1.18	-57.69	-57.69	-57.69
Air quality, noise and neighbourhood amenity	0.00	-21.50	-21.50	-44.41
Accessibility and active travel	-12.21	-12.21	-12.21	-12.21
Crime reduction and community safety	-0.57	-1.53	-41.17	-41.17
Access to healthy food	0.00	0.00	0.00	0.00
Climate change	-4.12	-25.12	-25.12	-25.12
TOTAL	**-18.07**	**-118.05**	**-157.69**	**-180.60**

Benefits estimated over 25 years; (Negative values indicate reductions in health costs, positive values indicate potential additional health costs); Values in £2024, NPV (Net present value of health changes) adjusted for 1.5% discount rate

5 A large part of the uncertainty in this range is due to the effects of flooding.

Comparator scenario

The comparator scenario would be a more realistic representation of development on site, given detailed ambitions in the Local Development Plan for the area. Therefore, this acts as a second baseline for our calculations. In this scenario, we see the effect of changes to walking and cycling infrastructure, and the removal of derelict buildings and poor-quality public realm. Air quality and noise risks are unchanged, but this scenario reveals a much healthier environment.

The key benefits of this scenario are expected to be the improvements to walking and cycling infrastructure, mitigation of flood risk, and small improvements to size and quality of green space in the area, which may encourage regular park use, lower risk of diabetes and weight gain. Values reflect movement from poor conditions for these characteristics, to those more equivalent to the average for the UK.

Post-Park delivery

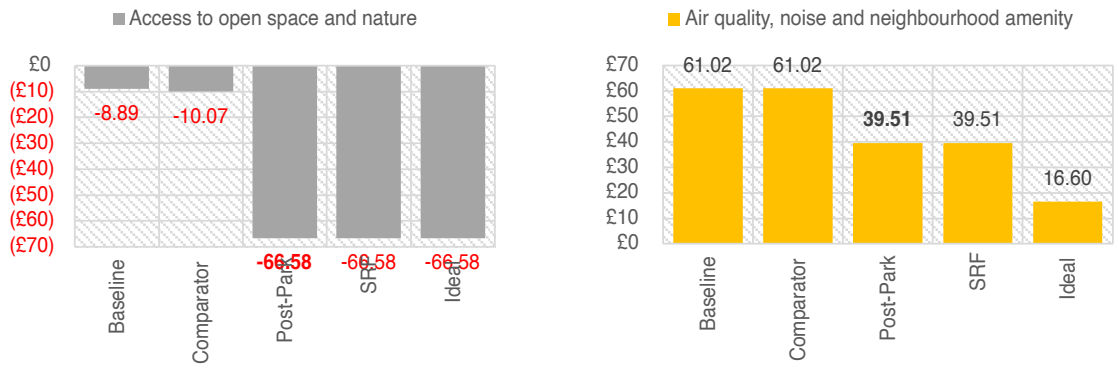
Compared to the local plan scenario, this scenario demonstrates the value of the quality and biodiversity of Mayfield Park, beyond minimum requirements, which is expected to increase the overall greenness of the area significantly. It also shows the value of additional mitigation of flood risk, and the benefit which is brought through improved perceptions of the area and lower fear of crime. Improvements to the public realm, including walking and cycling facilities, are also expected (Buro Happold, 2019).

Improvements to green space and air quality

The contribution of the green space to improving the overall greenness of the area may, in particular, help to improve activity levels, lower risk of premature mortality (-5%), and prevent cancer risk, specifically mouth and throat cancers (-2%). Benefits may also be seen in improved mental health outcomes, feelings of wellbeing and life satisfaction. The combined health savings related to this green space for a population of 3,000 individuals could be about -£58 million (range: -£23 million to £226.7 million). The range of uncertainty is largest for diabetes effects.

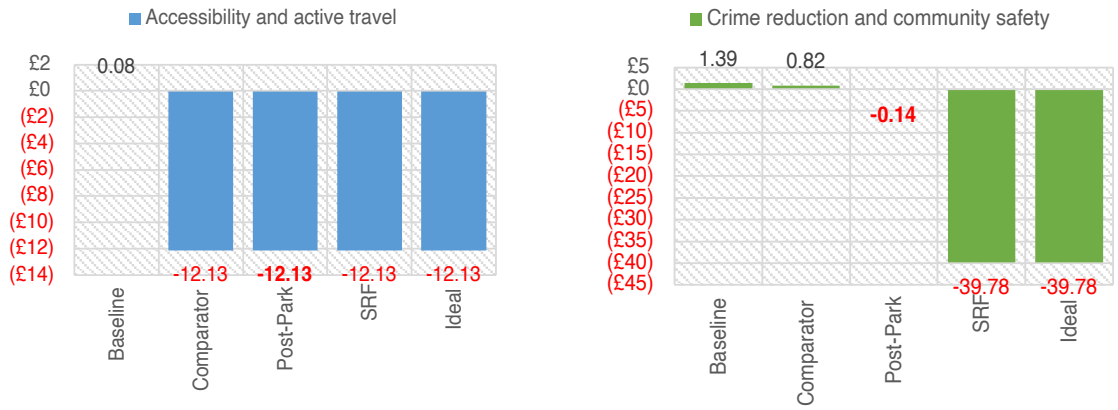
Baseline conditions at Mayfield Park provided under £8.9 million of health benefits through access to open spaces and nature. Local plans would have enhanced the benefits to £10 million. The post-development of the park by LandSec U+I may have delivered £66 million (Figure 4), the most achievable under the SRF and Ideal scenarios. Regarding air quality, noise and neighbourhood amenities, local plans are not expected to change the £61 million health costs estimated at baseline conditions. Post development associated health costs may reduce to £39.5 million, meeting the expected outcomes of the SRF scenario but with potential for further reduction.

Figure 4: Value of health impacts of access to open spaces, and air quality - all scenarios compared for residents within boundary (£ million)



After the development of the park, £12 million health savings may be expected as a result of improvements to active travel. £140,000 in health benefits associated with crime reduction and community safety may have been achieved (Figure 5), which is an improvement over the £1.4 million and £820,000 in net health cost at Baseline and local plan scenarios. The delivery of SRF plans may make a significant contribution to health through improved community safety.

Figure 5: Value of health impacts of active travel and crime reduction - all scenarios compared for residents within boundary (£ million)



The development of the park has significant contribution to reduce health costs linked to climate change through managing flood risk from £36 million at baseline conditions to just under £11 million, the best outcome expected under ideal conditions.

Figure 6: Value of health impacts of climate change - all scenarios compared for residents within boundary (£ million)

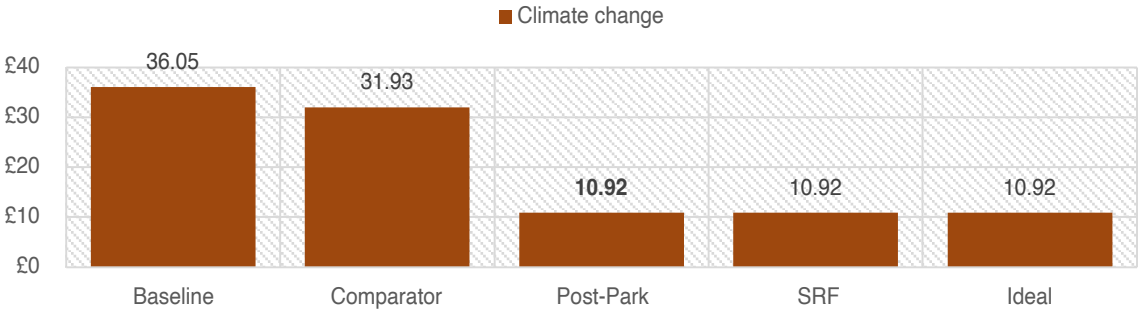
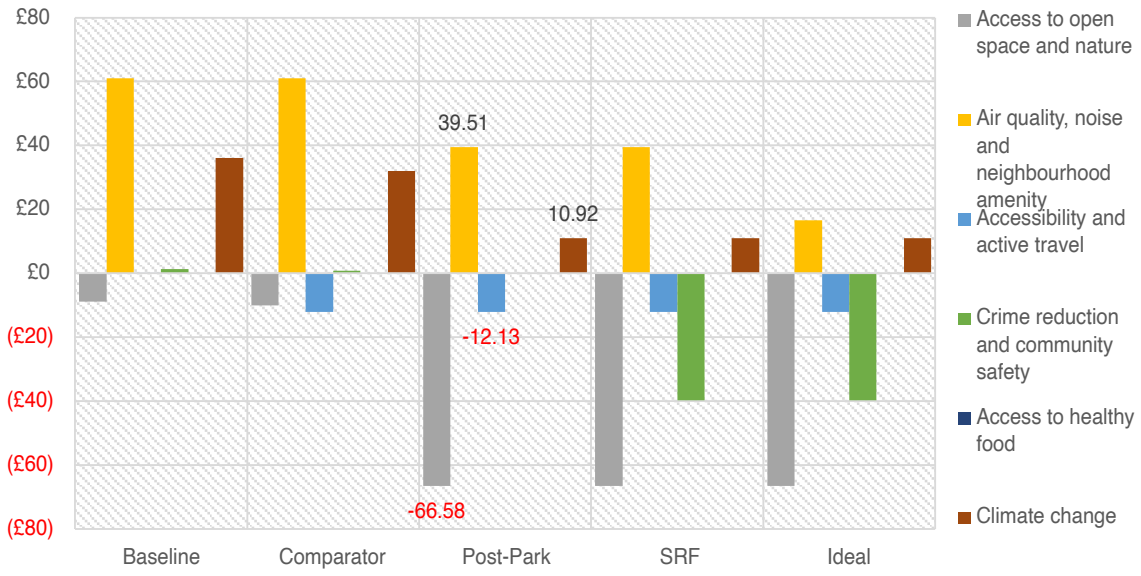


Figure 7 below compares the estimated value of changes to health under all scenarios. Local plans for Mayfield Park, though seeking to redress some of the baseline conditions, only manage to reduce overall health costs from £89 million to £71 million. At post-development, LandSec U+I deliver £28 million in health benefits, equivalent to £120 million in health savings compared to the baseline, with access to open space and nature being the key driver.

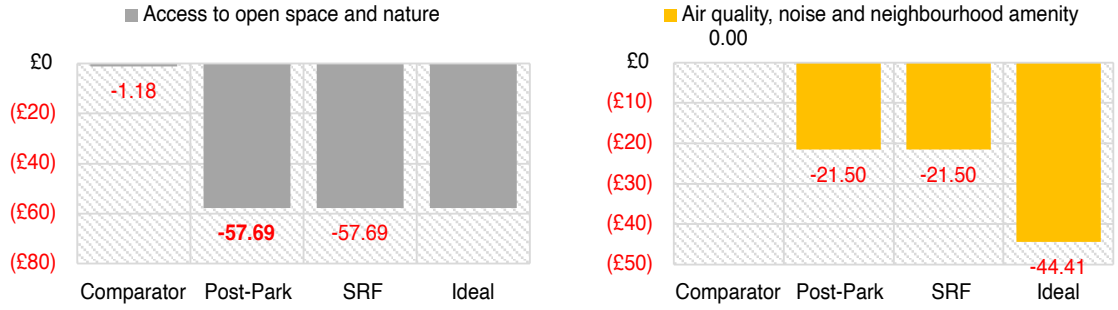
Figure 7: Value of health impacts - all scenarios compared for residents within boundary (£ million)



Net benefits of scenarios compared – access to open space and air quality

At completion of Mayfield Park development, net health benefits to residents within the boundary are estimated to amount to over £57 million compared to baseline conditions (Figure 8). Similarly, the development matches the expected health benefits of £21.5 million expected under the SRF scenario but has scope to more than double that level.

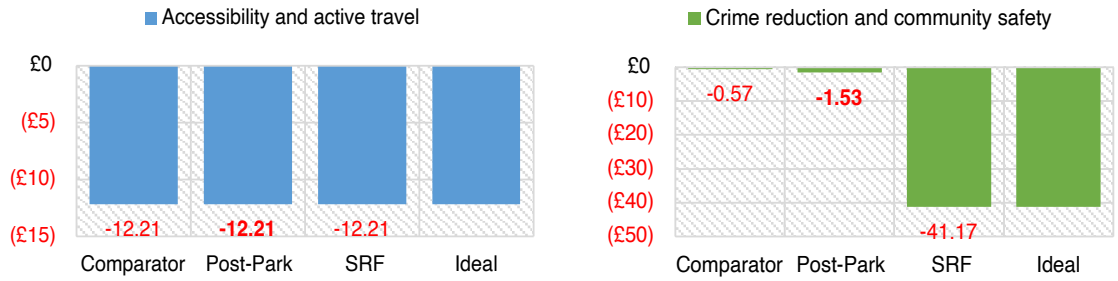
Figure 8: Net value of health impacts of access to open space, and air quality - all scenarios compared for residents within boundary (£ million)



Net benefits of scenarios compared – active travel and community safety

The development also achieves £12 million (Figure 9) in expected health benefits as a result of active travel at the local plan, also being the best achievable at both SRF and ideal conditions. Health benefits related to crime reduction and community safety at Post-Park, though nearly £1 million more over local plans, have scope to reach the SRF level of £41 million.

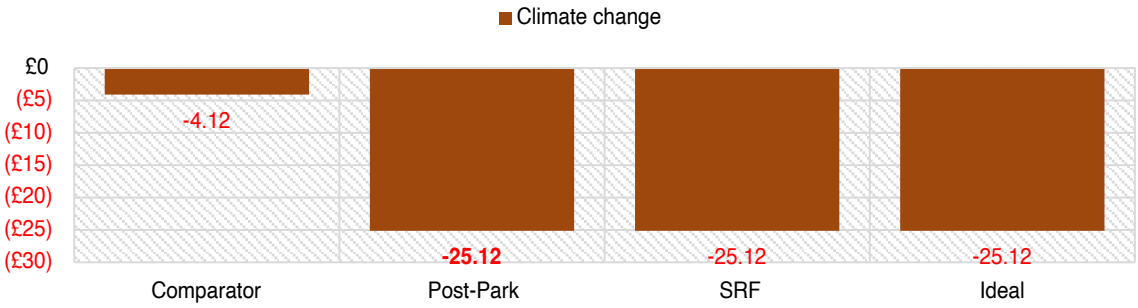
Figure 9: Net value of health impacts of active travel and crime reduction - all scenarios compared for residents within boundary (£ million)



Net benefits of scenarios compared – climate change

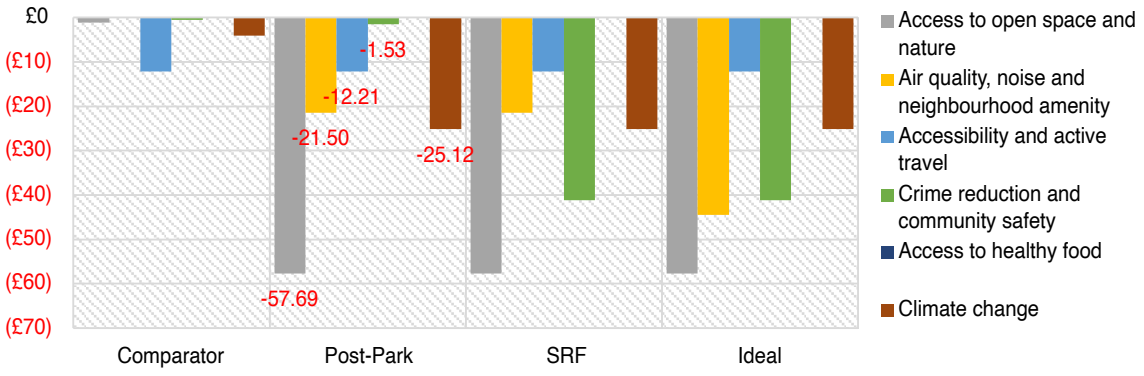
The net potential health savings associated with climate change and flood risk in particular (Figure 10) could be around £25 million over baseline conditions, improving on measures in the local plans.

Figure 10: Net value of health impacts of climate change - all scenarios compared for residents within boundary (£ million)



LandSec U+I development of Mayfield Park maximises health benefits associated with access to open spaces and nature, active travel and flood risk reduction to residents within the boundary. There remains scope in enhancing air quality and crime reduction related health savings. Figure 11 below shows the net expected health benefits of each scenario by environmental category compared to the Baseline conditions.

Figure 11: Net value of health impacts compared to Baseline - residents within boundary (£ million)



Net benefits of Strategic Regeneration Framework compared to Local Plan aspirations

In assumptions modelling, there are no residents living on site either at Baseline, or at Post-Park delivery. So, resident numbers in Baseline and Post-Park development for these elements are included as an experiment to test conditions reflected those in the scenarios. We do not know the conditions residents actually currently experience before they occupy

new homes on the Mayfield site. It might be most meaningful to consider Comparator and SRF here (Table 6 below) to compare attributable changes to health under the local plan, and the SRF proposals respectively.

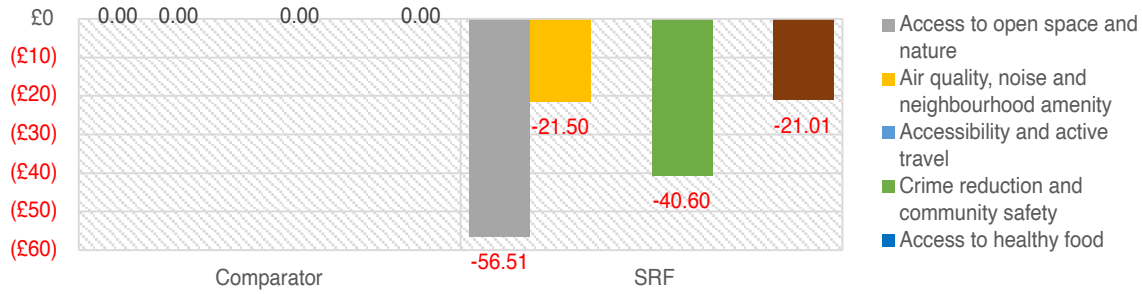
Table 6: Additional value of Landsec proposals Post-Park and SRF compared to local plans

Environmental Category	Post-Park	SRF	Ideal
Access to open space and nature	-56.51	-56.51	-56.51
Air quality, noise and neighbourhood amenity	-21.50	-21.50	-44.41
Accessibility and active travel	0.00	0.00	0.00
Crime reduction and community safety	-0.96	-40.60	-40.60
Access to healthy food	0.00	0.00	0.00
Climate change	-21.01	-21.01	-21.01
TOTAL	**-99.98**	**-139.62**	**-162.53**

Values in £2024 Million, NPV (Net present value of health changes) adjusted for 1.5% discount rate

Figure 12 demonstrates how improvements to noise pollution exposure, green space, and flood risk in the SRF, as well as improvements to the socio-economic status of the area, contribute to additional health improvements compared to the minimum requirements in the Comparator. Together, these improvements could be valued at -£140 million compared to the Comparator, or -£1,862 per resident per year in health savings.

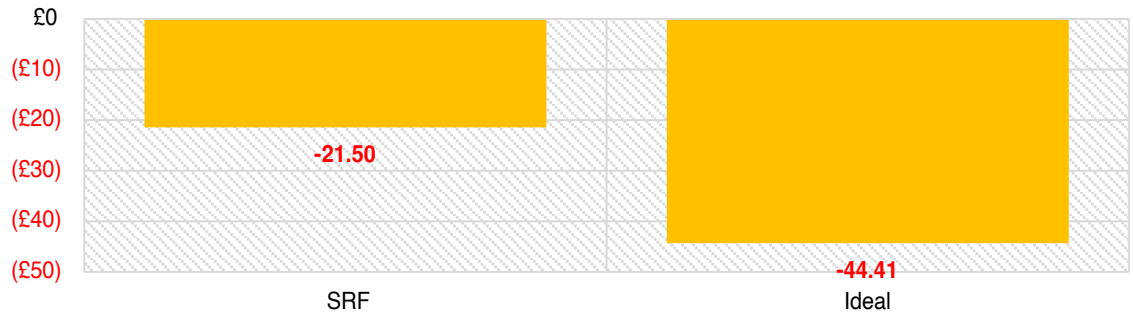
Figure 12: Net value of health impacts compared to Baseline - Comparator & SRF only (£ million)



Ideal scenario

The only area where conditions under the Ideal scenario are expected to be improved beyond conditions in the SRF is in air pollution – the ideal scenario tests for a reduction in air pollution, which could bring significant additional health benefits. Air pollution affects serious long term health conditions in adults such as cancers, diabetes, Parkinson's disease, and premature mortality (premature deaths may be increased by around a third due to air pollution). One of the largest impacts here is on risk of diabetes. Air pollution also affects children, resulting in asthma and other respiratory outcomes, and increased mortality risk as well. In all scenarios a small underlying risk of flooding remains. The value of a significant reduction in air pollution for this population could be £23 million over 25 years from £21 million to £44 million (Figure 13).

Figure 13: Net Value of health impact of air quality, Ideal and SRF scenarios compared to Baseline – residents within boundary (£ million)



3.3 Health for residents living within 300m external to the site boundary

Baseline

For this group, the impact of conditions at the Mayfield site form only part of overall conditions which this group experiences. Therefore, assumptions around changes to health are more limited than for the resident population within the site boundary. The largest changes to health are assumed to occur in relation to mitigation of poor levels of green space (Natural England, 2021) and the impact of having a large derelict site within walking distance in the baseline scenario. Table 7 below presents estimated values of the health impact of environmental conditions at baseline and future scenarios of Mayfield Park.

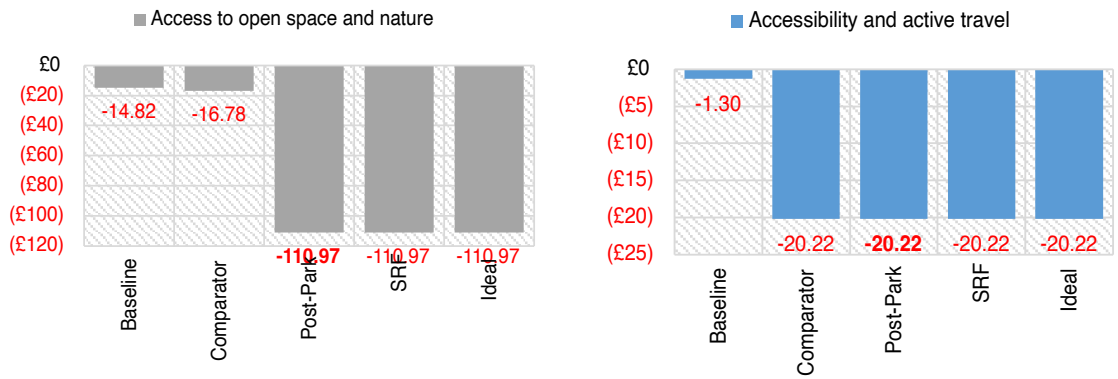
Table 7: Health impact Baseline and future scenarios compared -External Residents (£ million)

Environmental Category	Baseline	Comparator	Post-Park	SRF	Ideal
Access to open space and nature	-14.82	-16.78	-110.97	-110.97	-110.97
Air quality, noise and neighbourhood amenity	89.90	89.90	89.90	89.90	89.90
Accessibility and active travel	-1.30	-20.22	-20.22	-20.22	-20.22
Crime reduction and community safety	2.32	1.37	1.37	1.37	1.37
Access to healthy food	0.00	0.00	0.00	0.00	0.00
Climate change	0.00	0.00	0.00	0.00	0.00
TOTAL	**76.09**	**54.26**	**-39.92**	**-39.92**	**-39.92**
CHANGE FROM BASELINE	**-**	**-21.83**	**-116.01**	**-116.01**	**-116.01**

Benefits estimated over 25 years; (Negative values indicate reductions in health costs, positive values indicate potential additional health costs); Values in £2024, NPV (Net present value of health changes) adjusted for 1.5% discount rate

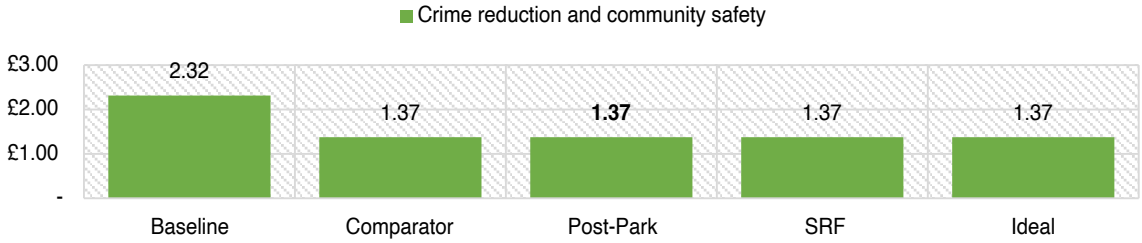
Health benefits are maximised after the development of the park (Figure 14). The development achieves £20 million in health savings related to active travel as expected under local plans, and £110 million due to access to open spaces, exceeding the expected £16 million health savings.

Figure 14: Value of health impacts of access to open space and active travel- external residents (£ Million)



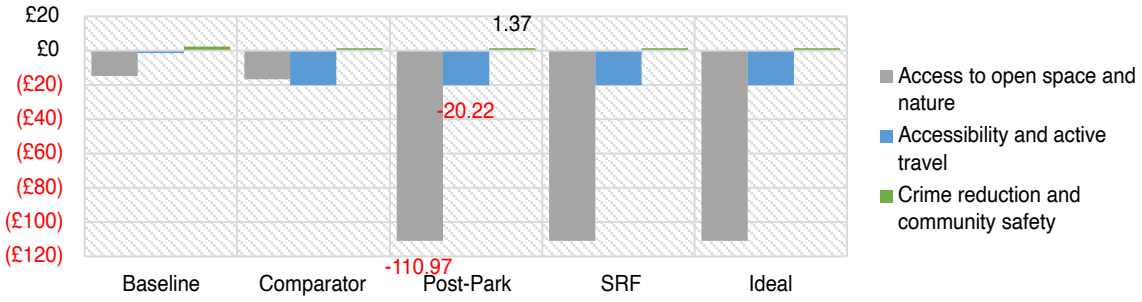
Compared to these categories, the impact of perceptions of crime and community safety appears relatively low, due to the expected change between current and future perceptions of safety in the area. Health costs remain at £1.3 million as expected under the local plans but a significant reduction from £2.3 million at Baseline conditions (Figure 15).

Figure 15: Value of health impacts of access to crime reduction and community safety - external residents (£ Million)



It is assumed that this group has no risk of flooding, and this is not influenced by changes on the Mayfield site. Generating about £39 million in health savings at completion, the development of Mayfield Park (Post-Park scenario) is estimated to contribute £116 million (Figure 16) in health savings over the Baseline conditions.

Figure 16: Value of health impacts all scenarios - external residents (£ Million)



Benefits estimated over 25 years, population 5,000; Values in £2024 Million, NPV (Net present value of health changes) adjusted for 1.5% discount rate

Future scenarios

Figure 16 above compares the net benefits of these changes to health. The Comparator Scenario demonstrates how the local plan may bring health benefits of improving the walkability and active travel infrastructure in the area, as well as improving perceived safety and a small amount of benefit from improvements to green space quality. For this population group, the Comparator Scenario represents the value of movements from poor to average provision of green space. However, from the Post-Park scenario, maximum benefits are reached through additional improvements to green space provision through

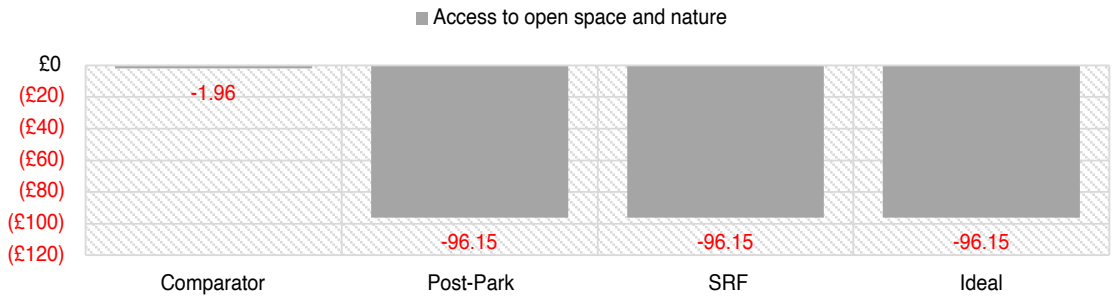
the delivery of Mayfield Park, which represents a significant increase in green space for the area. Compared to the Comparator Scenario, these benefits may be valued at around -£96 million over 25 years, or -£769 per person per year, even for those not resident on site.

Table 8: Net value of changes to health compared to Baseline - external residents (£ million)

Environmental Category	Comparator	Post-Park	SRF	Ideal
Access to open space and nature	-1.96	-96.15	-96.15	-96.15
Air quality, noise and neighbourhood amenity	0.00	0.00	0.00	0.00
Accessibility and active travel	-18.92	-18.92	-18.92	-18.92
Crime reduction and community safety	-0.95	-0.95	-0.95	-0.95
Access to healthy food	0.00	0.00	0.00	0.00
Climate change	0.00	0.00	0.00	0.00
TOTAL	**-21.83**	**-116.01**	**-116.01**	**-116.01**

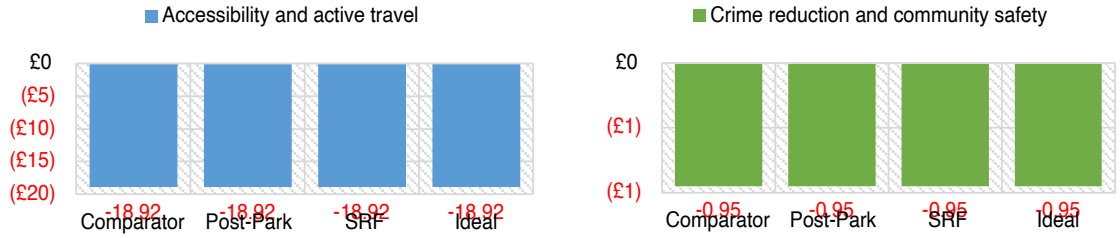
Benefits estimated over 25 years, population 3,000; Values in £2024 Million, NPV (Net present value of health changes) adjusted for 1.5% discount rate

Figure 17: Access to open space and nature: Net value of health impacts compared to Baseline - external residents (£ million)



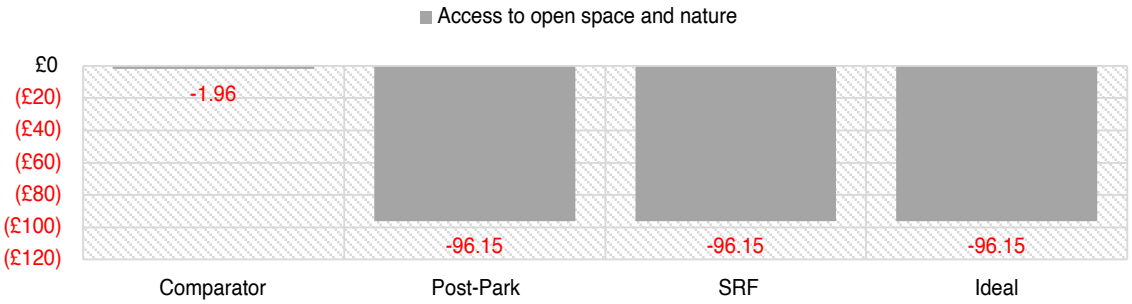
Health savings at Post-Park delivery, estimated to be £96 million, are significantly higher than the expected £1.9 million savings under the Comparator scenario (Figure 17, above) indicating that LandSec U+I development of Mayfield Park exceeds local plan minimum expectations. The development also delivers £18 million and £950,000 in health savings associated with active travel and crime reduction respectively as expected under the Comparator scenario (Figure 18, below). Notably, Post-Park delivery, the health savings achieved by the development of Mayfield Park match the expected savings under SRF and Ideal conditions.

Figure 18: Net value of health impacts of active travel and crime reduction and community safety - external residents (£ Million)



The development of Mayfield Park thus delivers in net health benefits to residents outside the site boundary but within 300 metres of the boundary a combined value of just under £120 million over 25 years (Figure 19) compared with Baseline conditions. The Post-Park delivery scenario not only achieves or exceeds local plan expected minimum health savings but also achieves the most possible under both the Strategic Regeneration Framework and Ideal scenarios.

Figure 19: Net value of health impacts all scenarios - external residents (£ Million)



3.4 Health for non-residential users of the site

Commuters

Modelling for this cohort has been a challenge given a lack of data on the health benefits to non-resident populations which could be associated with environmental changes, as well as how to determine the number of regular (rather than one-off) users of the site. Intuitively, it might be assumed that changes to the conditions on site might influence health for some users, but this would be highly uncertain given other influences, such as the conditions at home, or throughout the normal route to work or leisure.

As a conservative estimate, we assume that some health benefits may accrue to those individuals who regularly commute to the site, and therefore experience the environmental conditions there on a daily basis. There may be some overlap with resident populations. For this exercise, we limit results only to those effects which might influence individuals' choices around activity. Given that we estimate around 10,000 people may regularly commute to the site, we estimate that these individuals might experience benefits from changes to green space and active travel – two elements which are related to activity in the external environment.

Table 9 below compares changes in access to open space and active travel infrastructure. The chart shows how maximum benefits are reached under the Post-Park delivery scenario.

Table 9: Baseline impacts and future scenarios compared (Commuters)

Environmental Category	Baseline	Comparator	Post-Park	SRF	Ideal
Access to open space and nature	-11.96	-13.64	-86.85	-86.85	-86.85
Accessibility and active travel	0.00	-20.60	-20.60	-20.60	-20.60
TOTAL	-11.96	-34.24	-107.45	-107.45	-107.45
CHANGE FROM BASELINE	**-**	**-22.28**	**-95.49**	**-95.49**	**-95.49**

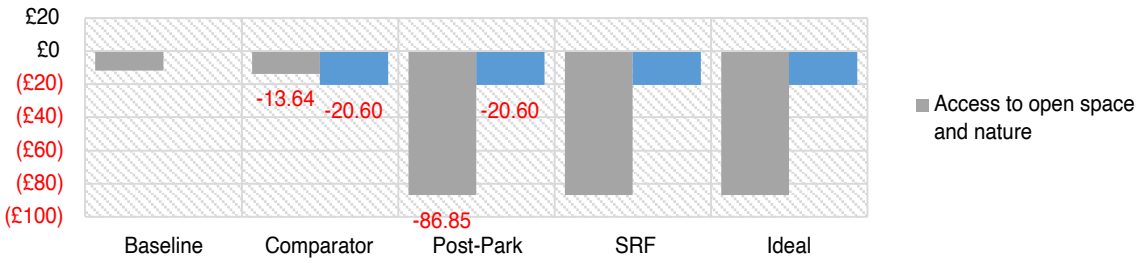
Benefits estimated over 25 years, population 10,000; Values in £2024 Million, NPV (Net present value of health changes) adjusted for 1.5% discount rate

At Baseline conditions, commuters may experience nearly £12 million in estimated health savings associated with access to open spaces and nature. This is based on average levels of access for the city. Under local plans for the development of the area, the expected health savings would increase to around £13.6 million. After delivery of the park, the health benefits have been valued at nearly £87 million (Figure 20), which would be the expected level achievable under the SRF and Ideal scenarios.

There were no established health costs nor savings related to accessibility and active travel at baseline conditions of the site. Expected health savings of £20 million under local plans were matched at Post-Park delivery, and being the estimated value in the SRF and Ideal scenarios.

Health savings to commuters related to accessing open spaces and active travel post-delivery of Mayfield Park are valued at £107 million over 25 years (Figure 20), beyond £34 million savings under local plans, and comparable to the SRF and Ideal scenarios.

Figure 20: Value of health impacts compared – commuters (£ million)



Net value of changes compared to baseline for commuters

In comparison with the baseline conditions, net health benefits associated with access to open spaces and active travel to commuters post-delivery of Mayfield Park, as shown in Table 10 below, are valued at £95.5 million, exceeding the £22 million estimation under local plans.

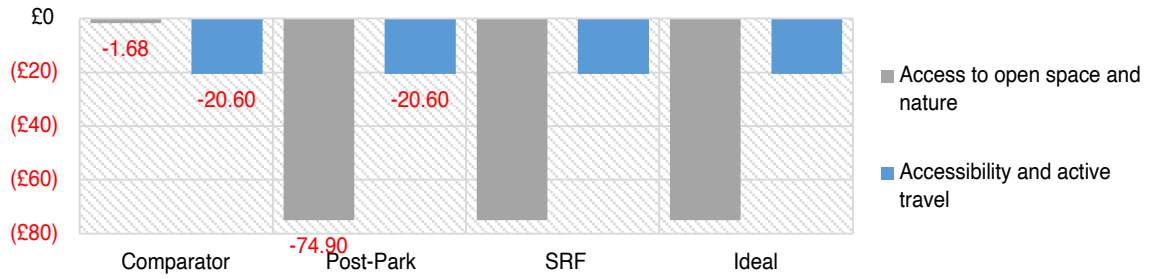
Table 10: Net value of changes to health compared to Baseline (Commuters)

Environmental Category	Comparator	Post-Park	SRF	Ideal
Access to open space and nature	-1.68	-74.90	-74.90	-74.90
Accessibility and active travel	-20.60	-20.60	-20.60	-20.60
TOTAL	**-22.28**	**-95.49**	**-95.49**	**-95.49**

Benefits estimated over 25 years, population 10,000; Values in £2024 Million, NPV (Net present value of health changes) adjusted for 1.5% discount rate

Post-delivery, the development of Mayfield Park, as Table 10 above and Figure 21 below show, achieves the net health benefits from active travel as under the local plans and significantly exceeds the Local lans in net benefits derived from accessing open space and nature on the site.

Figure 21: Net value of changes to health compared to Baseline Commuters (£ million)



Modelling suggests the value of changes in conditions for commuters could be in a range between -£95 million to -£876 million compared to the baseline. For this population group we have estimated values using the lower end of the range, in order to avoid overstating the size of potential benefits for this group. This value is equivalent to -£293 in health savings for each commuter per year. However, given the significant uncertainties related to estimating this, these results should be interpreted with caution. Further certainty could be provided by surveying regular commuters on their travel behaviours and conditions at their place of residence.

Leisure users

Although Mayfield Park is observed as an important new asset for the city, it has not been possible to identify how many people visit the park each year. Therefore, we are unable to calculate any health benefits related to regular users of the park who do not fall under the categories of user identified above. Improvements to parks may have a range of benefits: improvements may increase the odds of using parks by 8%, and regular park use has been associated with reductions in the risk of diabetes and weight gain. Just one person becoming active (going from inactive to meeting the WHO activity recommendations for regular physical activity) could save £13,174 in averted health costs every year. Therefore, we expect that there may be significant additional benefits for leisure users which has not been monetised so far in our calculations.

4.0 **Discussion**

Key findings and benefits of the study

1. What was the likely impact on the health of people living within a 300-metre radius of the environmental conditions at the Mayfield site before work started in 2016?
2. How might the proposals for redevelopment of the site change health? What does the strategic approach offer in addition to minimum policy aspirations for the site?
3. How useful is the approach for informing site development decision-making and investment appraisal?

Modelling suggests that before work began in 2016, some conditions on the Mayfield site may have contributed to increased risk of poor health for communities within walking distance. In particular, this site may have prevented active travel, through barriers to permeability, poor conditions for walking and cycling, and through poor perceived safety of the walking environment.

Our findings suggest that the delivery of Mayfield Park may have already brought significant additional benefits to these communities, bringing a range of health benefits related to a large increase in the size and quality of green space in the area, as well as measures to mitigate flood risk and improve the general quality of the public realm. We find that, although provisions in the local plan for the area may mitigate some of the existing risks related to conditions on the site in 2016, the strategic approach as set out in the SRF provides many additional benefits to health. These benefits extend beyond the boundary of the site, and may also improve health for non-residential site users. The additional value of the SRF may be around £234 million in averted health costs over 25 years for the 8,000 residents living in or near the site, which is nearly 5.9 times more than the local plan requirement (See Appendix 2).

Strengths and Limitations

Our study has several strengths. First, we used an impact-pathway approach to model health effects, which adds a level of robustness to modelling normally only used in air quality appraisal (Silveira et al., 2016). Secondly, we bring together detailed evidence on epidemiology and costs of illness at a level not normally used in HIA, which allows for understanding of trade-offs between health in land use scenarios.

However, the study has some limitations. In order to address data availability issues, this case study used many high-level assumptions about the relative quality of environmental conditions at the site for each of our scenarios (See Appendix 1). In particular, the additional benefits of the SRF depend on assumptions around the measures which are likely to occur under the provisions set out in the local plan. We have assumed many conditions in the local plan reflect average conditions for the UK, but this may have not reflected fully the ambition of policies for Manchester such as Streets for All.

Modelling assumed a static population, in order to facilitate comparisons between scenarios, but this does reflect that there was no existing population on site in 2016 and that the population for the areas around the site are expected to change over 25 years, with new developments taking place in the City Centre. The population modelled for our static populations are likely to be younger, with longer life expectancy and better health indicators than those in the adjacent populations such as Ardwick (Greater Manchester Combined Authority, 2024a). Sensitivity analysis could explore how findings might change if models were run based on the demographics of the Ardwick MSOA instead. We did not consider spillover effects from other major regeneration schemes nearby – a city-wide assessment should consider all in context to ensure that health benefits of scheme are not over-estimated. We have noted already some methodological challenges of non-resident health modelling for groups such as commuters and leisure users – further data could help to explore this issue.

There are limits within the HAUS model itself: This is a linear model, so cannot describe interactive effects, for example as an alternative, the HEAT tool estimates interactions between changes in transport mode and risk of injuries or air pollution (Kahlmeier et al., 2011). HAUS can only show single pathway effects, although overlaps are considered in both assumptions and aggregation of findings. As with all linear models, variable choice can influence findings, so sensitivity analysis is important to test assumptions – further modelling could explore benefits to populations within a wider area of influence, for example.

Health is only one aspect of the urban environment which enables individuals to thrive, and likewise the environment is only one determinant of health; HAUS does not consider employment, education, social and cultural capital or viability of schemes. However, our study provides a deeper dive into how urban environments can affect health specifically, and who is likely to bear the burden of this. This is line with aspirations set out in the latest version of the Green Book to improve understanding of the distributional effects of developments (HM Treasury, 2022).

5.0 **Conclusion**

We find that the quality of environmental conditions in the area meant residents living within 300m of the Mayfield site may have had higher than average risks of chronic, long-term disease and poor incentives to activity and active travel in 2016, before building works began. Compared to the minimum standards set out within the local plan for the area, the scheme as reflected by the emerging SRF could provide an additional £234 million of health economic savings over 25 years.

A large part of these benefits may already be realised through the delivery of Mayfield Park. The SRF could mitigate existing health risks by reducing premature mortality, encouraging activity, help prevent chronic diseases such as diabetes, and may bring additional benefits by improving mental health, wellbeing and life satisfaction. Benefits are likely to extend to communities outside the regeneration area and to non-residents using the site for work or leisure. Measures outside the project scope could improve health further, if additional measures to reduce the levels of air pollution were made.

Contributors

We thank and acknowledge the support of the Landsec U+I team for their invaluable input, feedback and support during the development of alternative scenarios and in the data collection task for this case study.

Disclaimer

This health impact modelling has only been able to monetise some benefits of the proposals to some users of the area; it may be that these proposals will improve conditions for a much wider group of people within the City of Manchester.

References

Buro Happold (2019) *Mayfield Cycling Strategy*: Manchester City Council [online]. Available from: https://pa.manchester.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PZVA4MBCJ9800 [Accessed 2024-12-18].

Deloitte (2019) *Mayfield, Phase 1, Environmental Impact Assessment (EIA)*: Deloitte LLP, London, UK [online]. Available from: https://pa.manchester.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PZVA4MBCJ9800 [Accessed 2024-12-18].

Deloitte (2023) Mayfield Phase 1 EIA Statement of Conformity. Deloitte LLP, London, UK.

Department for Communities and Local Government (2015) *English Indices of Deprivation 2015.* DCLG [online]. Available from: English indices of deprivation 2015 - GOV.UK: [Accessed 2024-12-18].

Eaton, E., Hunt, A. and Black, D. (2023) Developing and testing an environmental economics approach to the valuation and application of urban health externalities. *Frontiers in Public Health* 11 [online]. Available from: Frontiers | Developing and testing an environmental economics approach to the valuation and application of urban health externalities.

Extrium (2024) *England Noise and Air Quality Viewer* [online]. Available from: http://extrium.co.uk/noiseviewer.html# [Accessed 2024-10-11].

Greater Manchester Combined Authority (2024a) *Mapping GM.* Greater Manchester Combined Authority [online]. Available from: MappingGM [Accessed 2024-05-10] .

Greater Manchester Combined Authority (2024b) *Places for Everyone Joint Development Plan Document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan*. Manchester: GMCA.

HM Treasury (2022) *The Green Book: Central Government Guidance on Appraisal and Evaluation* [online]. Available from: https://assets.publishing.service.gov.uk/media/6645c709bd01f5ed32793cbc/Green_Book_2022__updated_links_.pdf [Accessed 14 May 2024].

JBA consulting (2011) *Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA*. Manchester City Council [online]. Available from: 2009s0290_Final_MST_Maps_Index_Mar_2011_V1.1 (2).pdf [Accessed 14 May 2024].

Jephcote, C., Clark, S.N., Hansell, A.L., Jones, N., Chen, Y., Blackmore, C., Eminson, K., Evans, M., Gong, X., Adams, K., Rodgers, G., Fenech, B. and Gulliver, J. (2023) Spatial assessment of the attributable burden of disease due to transportation noise in England. *Environment International,* 178.

Kahlmeier, S., Cavill, N., Dinsdale, H., H., R., Götschi, T. and Foster, C.E. (2011) *Health Economic Assessment Tools HEAT for Walking and Cycling. Methodology and User Guide.* Copenhagen: World Health Organization Regional Office for Europe.

Landsec U+I(2023) *Go-ahead for city's biggest cycle hub, new offices and more green space at Mayfield.* Landsec U+I [online]. Available from: https://www.uandiplc.com/news/mayfield-1a-green-light/ [Accessed 2024-05-07].

Mayfield Partnership (2018) *Mayfield Strategic Regeneration Framewor.* Manchester City Council. [online]: Available from: https://www.manchester.gov.uk/downloads/download/6851/mayfield_srf_february_2018 [Accessed 2024-12-17].

Mayfield Partnership (2024) *Mayfield Park - History.* Mayfield Partnership [online]. Available from: https://mayfieldmanchester.co.uk/history/ [Accessed 2024-05-07].

Natural England, 2021. *Green Infrastructure.* Natural England [online]. Available from: https://designatedsites.naturalengland.org.uk/GreenInfrastructure/Map.aspx [Accessed 6 November 2024].

NHS London Healthy Urban Development Unit (2017) *HUDU Planning for Health Rapid Health Impact Assessment Tool* 3rd Edition. NHS London Healthy Urban Development Unit [online]. Available from: http://www.healthyurbandevelopment.nhs.uk/wp-content/uploads/2017/05/HUDU-Rapid-HIA-Tool-3rd-edition-April-2017.pdf [Accessed 4 November 2024]

Office for National Statistics (ONS) (2024a) *Life expectancy for local areas of Great Britain: single year periods,* 2011 to 2023. ONS [online]. Available from: Life expectancy for local areas of Great Britain - Office for National Statistics [Accessed 2024-12-19].

Office for National Statistics (ONS) (2024b) *Lower layer Super Output Area population estimates (supporting information)* [online] Available from: Lower layer Super Output Area population estimates (supporting information) - Office for National Statistics [Accessed 2024-12-19].

Silveira, C., Roebeling, P., Lopes, M., Ferreira, J., Costa, S., Teixeira, J. P., Borrego, C., & Miranda, A. I. (2016) Assessment of health benefits related to air quality improvement strategies in urban areas: An Impact Pathway Approach. *Journal of Environmental Management*, 183, 694–702.

University of Cambridge (2017) *Food Environment Assessment Tool (FEAT*) [online]. Available from: https://www.feat-tool.org.uk/feat2/ [Accessed 2024-12-17].

Appendix 1: Baseline Assumptions

	Category	Characteristic	Baseline	Comparator	Post-Park	SRF	Ideal
Within Boundary	03 Access to open space and nature	Green space	Poor	Average	Good	Good	Good
		Places to Play	Poor	Average	Good	Good	Good
	04 Air quality, noise and neighbourhood amenity	Air quality	Poor	Poor	Poor	Poor	Good
		Noise	Poor	Poor	Good	Good	Good
		Proximity to main road	Poor	Poor	Poor	Poor	Poor
	05 Accessibility and active travel	Cycling infrastructure	Average	Good	Good	Good	Good
		Road Safety	Average	Average	Average	Average	Average
		Walkability	Poor	Average	Good	Good	Good
		Within walking distance	Good	Good	Good	Good	Good
	06 Crime reduction and community safety	economic status of area	Average	Average	Average	Good	Good
		Fear of crime	Poor	Average	Good	Good	Good
	07 Access to healthy food	Fast food outlets	Average	Average	Average	Average	Average
		Food environment	Average	Average	Average	Average	Average
		Small stores	Average	Average	Average	Average	Average
	11 Climate change	Flooding	Poor	Average	Good	Good	Good
External Residents	03 Access to open space and nature	Green space	Poor	Average	Good	Good	Good
		Places to Play	Poor	Average	Good	Good	Good
	04 Air quality, noise and neighbourhood amenity	Air quality	Poor	Poor	Poor	Poor	Poor
		Noise	Poor	Poor	Poor	Poor	Poor
		Proximity to main road	Average	Average	Average	Average	Average
	05 Accessibility and active travel	Cycling infrastructure	Good	Good	Good	Good	Good
		Road Safety	Average	Average	Average	Average	Average
		Walkability	Poor	Average	Good	Good	Good
		Within walking distance	Good	Good	Good	Good	Good
	06 Crime reduction and community safety	economic status of area	Average	Average	Average	Average	Average
		Fear of crime	Poor	Average	Average	Average	Average
	07 Access to healthy food	Fast food outlets	Average	Average	Average	Average	Average
		Food environment	Average	Average	Average	Average	Average
		Small stores	Average	Average	Average	Average	Average
Commuters	03 Access to open space and nature	Green space	Poor	Average	Good	Good	Good
		Places to Play	Poor	Average	Good	Good	Good
	05 Accessibility and active travel	Cycling infrastructure	Average	Good	Good	Good	Good
		Road Safety	Average	Average	Average	Average	Average
		Walkability	Poor	Average	Average	Good	Good
		Within walking distance	Good	Good	Good	Good	Good

Appendix 2: Summary net value over Baseline and proposal performance over Local Plans

Within Boundary	Net Value over Baseline (S1)					Multiple over Local Plans (S2)			
Environmental Category	**Comparator**	**Post-Park**	**SRF**	**Ideal**		**Comparator**	**Post-Park**	**SRF**	**Ideal**
Access to open space and nature	-1.18	-57.69	-57.69	-57.69		1.00	48.95	48.95	48.95
Air quality, noise and neighbourhood amenity	0.00	-21.50	-21.50	-44.41		-	-21.5*	-21.5*	-44.41*
Accessibility and active travel	-12.21	-12.21	-12.21	-12.21		1.00	1.00	1.00	1.00
Crime reduction and community safety	-0.57	-1.53	-41.17	-41.17		1.00	2.68	72.35	72.35
Access to healthy food	0.00	0.00	0.00	0.00		-	-	-	-
Climate change	-4.12	-25.12	-25.12	-25.12		1.00	6.10	6.10	6.10
TOTAL	**-18.07**	**-118.05**	**-157.69**	**-180.60**	**Combined**	**1.00**	**6.53**	**8.72**	**9.99**

External to Boundary	Net Value over Baseline (S1)					Multiple over Local Plans (S2)			
Environmental Category	**Comparator**	**Post-Park**	**SRF**	**Ideal**		**Comparator**	**Post-Park**	**SRF**	**Ideal**
Access to open space and nature	-1.96	-96.15	-96.15	-96.15		1.00	48.95	48.95	48.95
Air quality, noise and neighbourhood amenity	0.00	0.00	0.00	0.00		-	-	-	-
Accessibility and active travel	-18.92	-18.92	-18.92	-18.92		1.00	1.00	1.00	1.00
Crime reduction and community safety	-0.95	-0.95	-0.95	-0.95		1.00	1.00	1.00	1.00
Access to healthy food	0.00	0.00	0.00	0.00		-	-	-	-
Climate change	0.00	0.00	0.00	0.00		-	-	-	-
TOTAL	**-21.83**	**-116.01**	**-116.01**	**-116.01**	**Combined**	**1.00**	**5.31**	**5.31**	**5.31**

Commuters	Net Value over Baseline (S1)					Multiple over Local Plans (S2)			
Environmental Category	**Comparator**	**Post-Park**	**SRF**	**Ideal**		**Comparator**	**Post-Park**	**SRF**	**Ideal**
Access to open space and nature	-1.68	-74.90	-74.90	-74.90		1.00	44.54	44.54	44.54
Air quality, noise and neighbourhood amenity	-	-	-	-		-	-	-	-
Accessibility and active travel	-20.60	-20.60	-20.60	-20.60		1.00	1.00	1.00	1.00
Crime reduction and community safety	-	-	-	-		-	-	-	-
Access to healthy food	-	-	-	-		-	-	-	-
Climate change	-	-	-	-		-	-	-	-
TOTAL	**-22.28**	**-95.49**	**-95.49**	**-95.49**	**Combined**	**1.00**	**4.29**	**4.29**	**4.29**

	Net Value over Baseline (S1)					Multiple over Local Plans (S2)			
Population	**Comparator**	**Post-Park**	**SRF**	**Ideal**		**Comparator**	**Post-Park**	**SRF**	**Ideal**
Within Site Boundary (3,000)	-18.07	-118.05	-157.69	-180.60		1.00	6.53	8.72	9.99
External to site boundary (5,000)	-21.83	-116.01	-116.01	-116.01		1.00	5.31	5.31	5.31
TOTAL (8,000)	**-39.91**	**-234.07**	**-273.71**	**-296.62**	**Combined**	**1.00**	**5.87**	**6.86**	**7.43**
Commuters (10,000)	-22.28	-95.49	-95.49	-95.49		1.00	4.29	4.29	4.29

where 1 is Comparator Base Multiple

* £m NV since base value is 0


TRUUD