

Design Manual for Roads and Bridges



Sustainability & Environment
Appraisal

LA 112

Population and human health

(formerly DMRB Volume 11, Section 3, Part 6 (Land), Volume 11, Section 3, Part 8 (Pedestrians, Cyclists, Equestrians and Community Effects) and Volume 11, Section 3, Part 9 (Vehicle Travellers))

Revision 1

Summary

This document sets out the requirements for assessing and reporting the environmental effects on population and health from construction, operation and maintenance of highways projects.

Application by Overseeing Organisations

Any specific requirements for Overseeing Organisations alternative or supplementary to those given in this document are given in National Application Annexes to this document.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

This is a controlled document.

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Release notes

Version	Date	Details of amendments
1	Jan 2020	Revision 1 (January 2020) Revision to update references only. Revision 0 (October 2019) LA 112 replaces Volume 11, Section 3, Part 6 (Land), Volume 11, Section 3, Part 8 (Pedestrians, Cyclists, Equestrians and Community Effects) and Volume 11, Section 3, Part 9 (Vehicle Travellers). This full document has been re-written to make it compliant with the new Highways England drafting rules.

Foreword

Publishing information

This document is published by Highways England.

This document supersedes previous advice contained in the following documents which are now withdrawn:

- 1) Volume 11, Section 3, Part 6 (Land Use);
- 2) Volume 11, Section 3, Part 8 (Pedestrians, Cyclists, Equestrians and Community Effects); and
- 3) Volume 11, Section 3, Part 9 (Vehicle Travellers).

This document makes provision for requirements outlined under EU Directive 2011/92/EU as amended by 2014/52/EU (hereafter referred to as the 2014/52/EU [Ref 1.N]).

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

The motorway and all-purpose trunk road(s) connect people and places, supporting businesses and enabling access to employment, healthcare, education and other community assets.

Conversely, impacts associated with construction and improvement projects, (such as direct land take and severance) may affect private property, community and businesses/development land as well as agricultural land holdings.

The motorway and all-purpose trunk road network network can also affect the health of individuals and communities.

This document provides a framework for assessing, mitigating and reporting the effects of motorway and all-purpose trunk road projects on population and health. It introduces significance criteria that aid consistent and proportionate assessment to support the reporting of significant effects of population and human health.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 5.N] apply to this document.

Abbreviations

Abbreviations

Abbreviation	Definition
AQMA	Air Quality Management Area
COPD	Chronic obstructive pulmonary disease
DDA	Disability Discrimination Act 1995 DDA 1995 [Ref 2.N]
EIA	Environmental Impact Assessment
EqIA	Equality Impact Assessment
NIA	Noise Important Area
NMA	Noise Management Area
ONS	Office for National Statistics
PRoW	Public Right of Way
WCH	Walkers, cyclists and horse-riders

Terms and definitions

Terms and definitions

Term	Definition
Accessibility	The ability of users to access land, property, infrastructure, businesses and community facilities.
Access	The means by which to approach or enter land, property and assets.
Agricultural land holdings	Land and associated infrastructure for the purpose of agricultural production, e.g. arable farming, dairy farming etc.
Authorities likely to be concerned by a project	Authorities or organisations (statutory or non-statutory) that have environmental responsibilities or local and regional competences (as defined by the relevant consenting regime).
Businesses	Land and buildings for the purpose of commercial/industrial enterprise.
Community	A group of people living in the same place or having a particular characteristic in common.
Community land and assets	Land, buildings and infrastructure providing a service/resource to a community, e.g. open spaces, village greens, village halls, healthcare and education facilities etc.
Environmental assessment	A process by which information about environmental effects is collected, assessed and used to inform decision-making. NOTE: This includes Environmental Impact Assessment and non-statutory environmental assessment.
Development land	Land identified in national or local plans, policies or strategies for development (including intensification of existing uses) and land subject to planning permission.
Health determinants	Personal, social, economic and environmental factors which determine the health status of individuals and communities.
Human health	A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.
Health outcome	The health status of an individual, group or population, attributable to a planned intervention (e.g a project).
Health profile	Statistical picture of the baseline health conditions and trends within an area. NOTE: A profile can be built up for a variety of scales (e.g. ward, Local Authority or more strategic levels e.g. Local Enterprise Partnerships).
Journey length	Physical length of a journey.
Land take	Temporary or permanent use of land for a project which takes it from private or public landholdings.

Terms and definitions (continued)

Term	Definition
Local planning authority area	A local authority's administrative boundary.
Population	All individuals located in a particular location (this can be local, regional or at a national scale).
Private property and housing	Land, buildings and infrastructure for the purpose of residential use.
Severance	The extent to which members of communities are able (or not able) to move around their community and access services/facilities.
Strategic housing sites	Large scale sites/land allocated in local planning policy for the provision of residential land use.
Strategic employment sites	Large scale sites/land allocated in local planning policy for the provision of employment land use.

1. Scope

Aspects covered

1.1 Environmental assessment of population and human health effects shall report on the following elements:

- 1) land-use and accessibility including;
 - a) private property and housing;
 - b) community land and assets;
 - c) development land and businesses;
 - d) agricultural land holdings; and
 - e) walkers, cyclists and horse-riders (WCH).
- 2) human health including;
 - a) health profiles of affected communities;
 - b) health determinants (e.g noise or air pollution); and
 - c) likely health outcomes.

1.2 Environmental assessments shall describe impacts on population and human health in line with the wider requirements and advice provided in:

- 1) LA 101 [Ref 4.N] Introduction to environmental assessment;
- 2) LA 102 [Ref 7.N] Screening projects for Environmental Impact Assessment (EIA);
- 3) LA 103 [Ref 6.N] Scoping projects for environmental assessment; and
- 4) LA 104 [Ref 3.N] Environmental assessment and monitoring.

Implementation

1.3 This document shall be implemented forthwith on all projects involving environmental assessment of population and human health on the Overseeing Organisations' motorway and all-purpose trunk roads according to the implementation requirements of GG 101 [Ref 5.N].

NOTE The specific approach to implementation of this document and the significance criteria within this document is governed by the requirements of GG 101 [Ref 5.N].

Use of GG 101

1.4 The requirements contained in GG 101 [Ref 5.N] shall be followed in respect of activities covered by this document.

2. Principles and purpose

Assessment and consultation

2.1 Consultation with authorities likely to be concerned by the project shall be undertaken in accordance with LA 104 [Ref 3.N].

NOTE 1 Consultation includes the appropriate statutory body who are the primary, definitive source of policy, information and opinion on population and health.

NOTE 2 Stakeholders can often provide information, or are aware of certain issues which can assist the design and assessment process (e.g. concerns regarding local sensitivity).

2.1.1 Consultation for the population and health assessment should complement and not duplicate consultation activities undertaken as part of the broader project development process.

NOTE Targeted consultation outside of the formal scoping process can be undertaken with relevant stakeholders where this can help inform the baseline scenario and assessment conclusions.

2.1.2 Indicative stakeholders who may be engaged comprise:

- 1) local authority officers (economic and environmental) and the director of public health;
- 2) community leaders/representatives and leaders of local interest groups;
- 3) affected community groups (e.g. residents/neighbourhood associations, schools, places of worship, community centres);
- 4) representatives of national and local recreational societies/traveller groups such as ramblers associations and equestrian groups;
- 5) local elected officials (e.g. parish/local councillors, members of parliament, local crime officers);
- 6) local police force; and
- 7) other stakeholders identified by the Overseeing Organisation.

3. Assessment methodology

Land-use and accessibility

Scoping

- 3.1 The scoping assessment shall report on the likely effects of projects on land-use and accessibility covering the following elements:
- 1) private property and housing;
 - 2) community land and assets;
 - 3) development land and businesses;
 - 4) agricultural land holdings; and
 - 5) WCH.
- 3.2 The scoping assessment shall report on the nature and scale of effects on the land use and accessibility elements as either:
- 1) beneficial;
 - 2) neutral; or
 - 3) adverse.
- 3.3 The scoping assessment shall report on the likely changes to accessibility and severance for private property and housing, community land and assets, development land and businesses and agricultural land holdings.
- 3.4 The scoping assessment shall report on the likely changes to WCH provision as a result of the project.
- 3.5 Where the requirement to acquire land and assets is likely to result in significant effects, either through direct land take or the restriction of accessibility/introduction of severance, further assessment shall be undertaken.

Study area

- 3.6 The study area shall be based on the construction footprint/project boundary (including compounds and temporary land take) plus a 500m area surrounding the project boundary.
- 3.6.1 Where likely effects are identified outside the 500m area surrounding the project boundary, the study area should be extended accordingly.
- 3.6.2 Where effects are unlikely to occur within the 500m area surrounding the project boundary, the study area should be reduced accordingly.

Baseline scenario

- 3.7 The process for developing the land use and accessibility baseline shall comprise the following phases:
- 1) data collection (commencing at the screening/scoping stage and developed with greater detail if further assessment is required);
 - 2) spatial data mapping; and
 - 3) consultation (where required to inform assessment conclusions).
- 3.8 The indicative types of data to be collected to form the baseline for land use and accessibility shall comprise:
- 1) private property and housing:
 - a) the location and number of properties at risk of demolition, or from which land will be required/access affected by a project; and
 - b) the location of residential development land and number of units that will be affected by a project.

- 2) community land and assets:
 - a) the location of community land (e.g common land, village greens, open green space, allotments, sports pitches etc) and amount of land which will be required/access affected by a project;
 - b) the location of community assets (e.g. village halls, healthcare facilities, education facilities, religious facilities etc) and number of assets from which land will be required/access affected by a project;
 - c) the level of existing accessibility restrictions/severance to community land and assets within the study area; and
 - d) the frequency of use of community land and assets within the study area.
- 3) development land and businesses:
 - a) the location and number of businesses (and associated jobs) at risk or from which land will be required/access affected by a project;
 - b) the location of land allocated for development by local authorities and the number of future jobs that will be affected by a project;
 - c) land not allocated by local authorities which is subject to planning application(s) supporting future jobs; and
 - d) the level of existing accessibility restrictions/severance to development land and businesses within the study area.
- 4) agricultural land holdings:
 - a) the type, location and number of agricultural holdings at risk of demolition or from which land will be required/access affected by a project;
 - b) the level of existing severance/accessibility restrictions to agricultural land holdings within the study area; and
 - c) the frequency of use of the agricultural holdings/assets within the study area.
- 5) WCH:
 - a) the type, location and extent of WCH provision (e.g. public rights of way) within the study area; and
 - b) the frequency of use of the WCH provision within the study area.

3.8.1 Publicly available data should be used, where available, to inform frequency of use of community land and assets and agricultural land holdings.

3.8.2 Where required to inform the baseline scenario and assessment conclusions in the absence of available information, targeted consultation and surveys should be undertaken to:

- 1) obtain frequency/use data for community land and assets and agricultural land holdings; and
- 2) obtain frequency/use data for WCH provision.

3.9 Where a project is in an early stage of development/assessment, data collection and surveys shall be proportionate and appropriate.

3.10 Data collected shall be in accordance with the Overseeing Organisation's asset data requirements.

Significance criteria

3.11 The sensitivity of land use receptors shall be reported in accordance with the criteria outlined in Table 3.11.

Table 3.11 Environmental value (sensitivity) and descriptions

Receptor value (sensitivity)	Description
Very high	Private property and housing: 1) existing private property or land allocated for housing located in a local authority area where the number of households are expected to increase by >25% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (e.g. strategic housing sites) covering >5ha and / or >150 houses. Community land and assets where there is a combination of the following: 1) complete severance between communities and their land/assets, with little/no accessibility provision; 2) alternatives are only available outside the local planning authority area; 3) the level of use is very frequent (daily); and 4) the land and assets are used by the majority (>=50%) of the community. Development land and businesses: 1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >5ha. Agricultural land holdings: 1) areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a frequent basis (daily). WCH: 1) national trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment land uses and other services with a direct and convenient WCH route. Little / no potential for substitution. 2) routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs. 3) rights of way for WCH crossing roads at grade with >16,000 vehicles per day.

Table 3.11 Environmental value (sensitivity) and descriptions (continued)

Receptor value (sensitivity)	Description
High	Private property and housing: 1) private property or land allocated for housing located in a local planning authority area where the number of households are expected to increase by 16-25% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (e.g. strategic housing sites) covering >1-5ha and / or >30-150 houses. Community land and assets where there is a combination of the following: 1) there is substantial severance between community and assets, with limited accessibility provision; 2) alternative facilities are only available in the wider local planning authority area; 3) the level of use is frequent (weekly); and 4) the land and assets are used by the majority (>=50%) of the community. Development land and businesses: 1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >1 - 5ha. Agricultural land holdings: 1) areas of land in which the enterprise is dependant on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a frequent basis (weekly). WCH: 1) regional trails and routes (e.g. promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution; and/or 2) rights of way for WCH crossing roads at grade with >8,000 - 16,000 vehicles per day.

Table 3.11 Environmental value (sensitivity) and descriptions (continued)

Receptor value (sensitivity)	Description
Medium	Private property and housing: 1) houses or land allocated for housing located in a local authority area where the number of households are expected to increase by >6-15% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (e.g. strategic housing sites) covering <1ha and / or <30 houses. Community land and assets where there is a combination of the following: 1) there is severance between communities and their land/assets but with existing accessibility provision; 2) limited alternative facilities are available at a local level within adjacent communities; 3) the level of use is reasonably frequent (monthly); and 4) the land and assets are used by the majority (>=50%) of the community. Development land and businesses: 1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering <1ha. Agricultural land holdings: 1) areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly). WCH: 1) public rights of way and other routes close to communities which are used for recreational purposes (e.g. dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys, and / or 2) rights of way for WCH crossing roads at grade with >4000 - 8000 vehicles per day.

Table 3.11 Environmental value (sensitivity) and descriptions (continued)

Receptor value (sensitivity)	Description
Low	Private property and housing: 1) proposed development on unallocated sites providing housing with planning permission/in the planning process. Community land and assets where there is a combination of the following: 1) limited existing severance between community and assets, with existing full Disability Discrimination Act (DDA) DDA 1995 [Ref 2.N] compliant accessibility provision; 2) alternative facilities are available at a local level within the wider community; 3) the level of use is infrequent (monthly or less frequent); and 4) the land and assets are used by the minority (>=50%) of the community. Development land and businesses: 1) proposed development on unallocated sites providing employment with planning permission/in the planning process. Agricultural land holdings: 1) areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent). WCH: 1) routes which have fallen into disuse through past severance or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes, and/or 2) rights of way for WCH crossing roads at grade with <4000 vehicles per day.

Table 3.11 Environmental value (sensitivity) and descriptions (continued)

Receptor value (sensitivity)	Description
Negligible	Private property and housing: 1) N/A. Community land and assets where there is a combination of the following: 1) no or limited severance or accessibility issues; 2) alternative facilities are available within the same community; 3) the level of use is very infrequent (a few occasions yearly); and 4) the land and assets are used by the minority ($\geq 50\%$) of the community. Development land and businesses: 1) N/A. Agricultural land holdings: 1) areas of land which are infrequently used on a non-commercial basis. WCH: 1) N/A.

NOTE 1 *Private property and housing: a higher sensitivity value can be allocated where private property or housing provision is integral to the character and function of the community with little/no provision for substitution (e.g. private property in small rural villages).*

NOTE 2 *Development land and businesses: a higher sensitivity score can be allocated where a business is the main source of employment for a community with little/no provision for substitution.*

3.12 The magnitude of change shall be reported in accordance with the criteria outlined in Table 3.12.

Table 3.12 Magnitude of impact and typical descriptions

Magnitude of impact (change)	Typical description
Major	Private property and housing, community land and assets, development land and businesses and agricultural land holdings: 1) loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. e.g. direct acquisition and demolition of buildings and direct development of land to accommodate highway assets; and/or 2) introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision. WCH: >500m increase (adverse) / decrease (beneficial) in WCH journey length.

Table 3.12 Magnitude of impact and typical descriptions (continued)

Magnitude of impact (change)	Typical description
Moderate	Private property and housing, community land and assets, development land and businesses and agricultural land holdings: 1) partial loss of/damage to key characteristics, features or elements, e.g. partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severe severance with limited / moderate accessibility provision. WCH: >250m - 500m increase (adverse) or decrease (beneficial) in WCH journey length.
Minor	Private property and housing, community land and assets, development land and businesses and agricultural land holdings: 1) a discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g. amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision. WCH: >50m - 250m increase (adverse) or decrease (beneficial) in WCH journey length.
Negligible	Private property and housing, community land and assets, development land and businesses and agricultural land holdings: 1) very minor loss or detrimental alteration to one or more characteristics, features or elements. e.g. acquisition of non operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings; and/or 2) very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision. WCH <50m increase (adverse) or decrease (beneficial) in WCH journey length.
No change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

3.13 The significance of effect shall be derived by combining the assigned value (sensitivity) of receptors with the magnitude of change arising from a project, in accordance with LA 104 [Ref 3.N].

3.14 The significance of effect shall be determined for each element of the land and accessibility sub topic (e.g. private property and housing, development land and businesses etc) affected by a project.

NOTE *Significant effects typically comprise effects after consideration of mitigation that are within the moderate, large or very large categories.*

Design and mitigation

- 3.15 The following mitigation hierarchy shall be implemented during design and assessment:
- 1) avoidance and prevention:
 - a) identify alternative design/route options that avoid the requirement to compulsory purchase property, land and assets; and
 - b) identify alternative design/route options that avoid introducing or worsening severance and avoid reducing WCH provision/increasing journey times.
 - 2) reduction:
 - a) minimise impacts on property, land and assets by selecting route alignments that avoid land take from the most sensitive receptors/aspects of receptors thereby maintaining viability; and
 - b) by altering alignment to minimise severance to communities and disruption to WCH provision.
 - 3) remediation: where it is not possible to avoid or reduce a significant adverse affect, e.g. community sports pitches have to be acquired to facilitate construction, provide equivalent facilities as close to the original location as possible.

NOTE *Engagement with designers and stakeholders early in the assessment and design process increases the effectiveness of design and mitigation measures.*

- 3.16 WCH design, assessment and provision shall be in accordance with GG 142 [Ref 8.N] Walking, cycling and horse-riding assessment and review.

Environmental enhancement

- 3.17 Enhancement opportunities shall be identified and reported during all stages in a project's life cycle.

NOTE *Example enhancement opportunities for land use and accessibility include;*

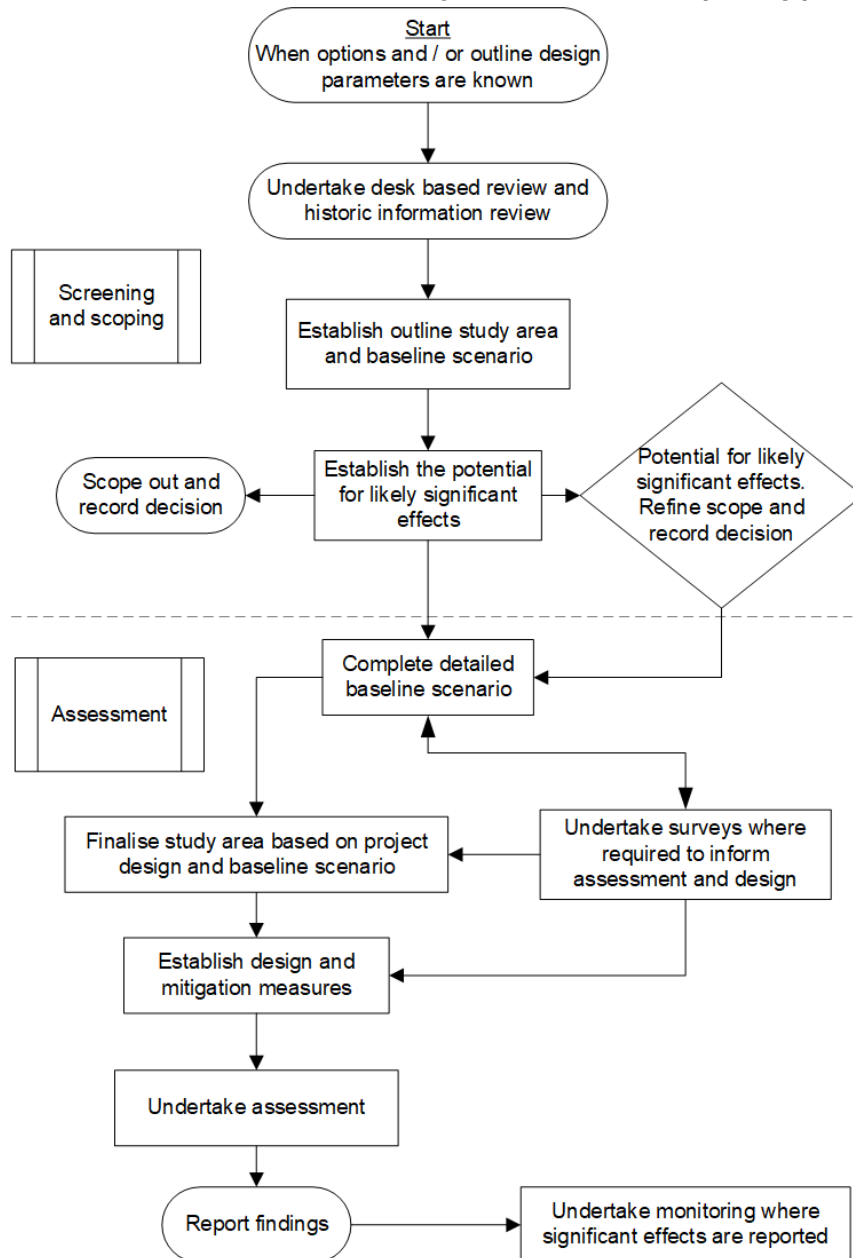
- 1) *returning non-operational highway estate to community use/ownership (in agreement with relevant land owners) following completion of construction.*

Reporting

- 3.18 Land use effects shall be assessed during construction and for the first year of operation (future year scenario).

NOTE *After year the first year of operation, effects on land use associated with routine maintenance operations are unlikely to be significant.*

- 3.19 The design and assessment shall follow the process illustrated in Figure 3.19.

Figure 3.19 Land use and accessibility assessment and reporting process

Human health

Scoping

- 3.20 The scoping assessment shall identify the health profile(s) of affected communities, identifying vulnerable groups/communities.
- 3.21 The scoping assessment shall identify health determinants likely to be affected by a project, specifically reporting on:
- 1) environmental conditions relevant to human health, including;
 - a) ambient air quality and Air Quality Management Areas (AQMA);
 - b) ambient noise and areas sensitive to noise (e.g noise important areas (NIA), noise management areas (NMA));
 - c) sources of pollution (e.g. light, odour, contamination etc);
 - d) landscape amenity; and

- 2) severance/accessibility and the ability of communities to access community land, assets and employment.

NOTE *Changes in accessibility/severance for communities that can influence health outcomes include (but are not limited to):*

- 1) *reduced or increased access to open green space/recreational facilities;*
- 2) *reduced or increased opportunities for WCH; and*
- 3) *reduced or increased opportunities for accessing healthcare facilities.*

3.22 Where a project has the potential to result in adverse health outcomes, further assessment shall be undertaken.

Study area

3.23 The study area shall be defined based on the following:

- 1) the extent and characteristics of a project, and
- 2) the communities/wards directly and indirectly affected by the project.

NOTE *The study area is unique to each project and is based on the sensitivity of affected communities and the nature/extent of the project resulting in changes to health determinants.*

Baseline scenario

3.24 The process for developing the health baseline shall comprise the following phases:

- 1) data collection (commencing at the screening/scoping stage and developed if further assessment is required);
- 2) spatial data mapping; and
- 3) consultation.

3.25 The baseline health profiles of the communities within the study area shall be established, including the following data;

- 1) percentage of community with increased susceptibility to health issues (vulnerable members, e.g. <16 & >65);
- 2) percentage of community with pre-existing health issues (e.g respiratory disease/chronic obstructive pulmonary disease (COPD));
- 3) deaths from respiratory diseases;
- 4) percentage of community with long term illness or disability;
- 5) general health;
- 6) life expectancy; and
- 7) income deprivation.

3.26 The following indicative types of health determinants shall be identified to inform the baseline scenario:

- 1) the location and type of community, recreational and education facilities and severance/separation of communities from such facilities;
- 2) the location of green/open space and severance/separation of communities from such facilities;
- 3) the location of healthcare facilities and severance/separation of communities from such facilities;
- 4) outline spatial characteristics of the transport network and usage in the area, including the surrounding road network, Public Rights of Way (including bridleways), cycle ways, non-designated public routes and public transport routes;
- 5) air quality management areas and ambient air quality;

- 6) areas recognised as being sensitive to noise (e.g. noise important areas, noise management areas) and the ambient noise environment;
- 7) sources and pathways of potential pollution (e.g. land/water contamination);
- 8) landscape amenity;
- 9) safety information associated with the existing affected road network (e.g. numbers of killed and seriously injured); and
- 10) where available, information collated from stakeholder consultation.

NOTE *Information collated to inform the land use and accessibility assessment can be used to inform the changes in accessibility/severance to communities in the context of human health.*

3.27 Data collected shall be in accordance with the Overseeing Organisation's asset data requirements.

Assessment criteria - human health

3.28 A qualitative assessment of human health shall be undertaken, with evidence provided to support conclusions.

3.28.1 The geographical extent of the impacts considered within the qualitative assessment should be dependent upon the nature and characteristics of a project and sensitivity of receptors.

NOTE 1 *Although the assessment of human health effects describes the likely qualitative health outcomes, it is not possible to quantify the severity or extent of the effects which give rise to these outcomes. The potential health outcomes during construction and operation are based on broad categories for the qualitative impacts identified.*

NOTE 2 *The plausibility of a project generating an impact on the health of individuals and communities can be evidenced using a source-pathway-receptor model IEMA health in EIA [Ref 1.1].*

3.29 Changes to health determinants as a result of a project shall be identified.

3.29.1 Information gathered for other environmental factors, such as air quality, should be used to help identify changes to health determinants.

NOTE *A change to a single health determinant can affect the health status of different individuals or communities depending on their characteristics and sensitivity to change, thereby generating multiple health outcomes.*

3.30 Once the health profile of communities has been established, the sensitivity of a community/population to change shall be identified (supported with evidence).

3.31 The sensitivity of a community/population shall be reported as:

- 1) low;
- 2) medium; or
- 3) high

3.32 Once community/population sensitivity and changes to health determinants likely to occur as a result of a project have been established, the likely health outcome(s) shall be identified in line with the categories in Table 3.32, with evidence provided to support conclusions.

Table 3.32 Human health outcome categories

Health outcome category	Health outcome description
Positive	A beneficial health impact is identified
Neutral	No discernible health impact is identified
Negative	An adverse health impact is identified
Uncertain	Where uncertainty exists as to the overall health impact

Design and mitigation

3.33 The following mitigation hierarchy shall be implemented during the design and assessment process:

- 1) avoidance and prevention: identify alternative design/route options that avoid severing highly sensitive communities and avoid compounding existing health issues in sensitive communities, e.g. avoid worsening air quality in sensitive communities where EU limit values are currently being exceeded;
- 2) reduction: minimise severance/isolating communities from facilities/services by providing connectivity over/under the route option, and provide mitigation to minimise health effects e.g. install noise fencing where appropriate; and
- 3) remediation: where there is likely to be a significant change to a health determinant, e.g. loss of recreation space, provide replacement equivalent facilities as close as possible to the original facility.

NOTE Engagement with designers and stakeholders early in the assessment and design process increases the effectiveness of design and mitigation measures.

Environmental enhancement

3.34 Enhancement opportunities shall be identified and reported during all stages in a project's life cycle.

NOTE Example enhancement opportunities for population and health include:

- 1) *increasing WCH provision from baseline levels to encourage WCH journeys and reduce journey times; and*
- 2) *investment in community initiatives such as tree planting on community land/open space as a means of enhancing the local landscape amenity.*

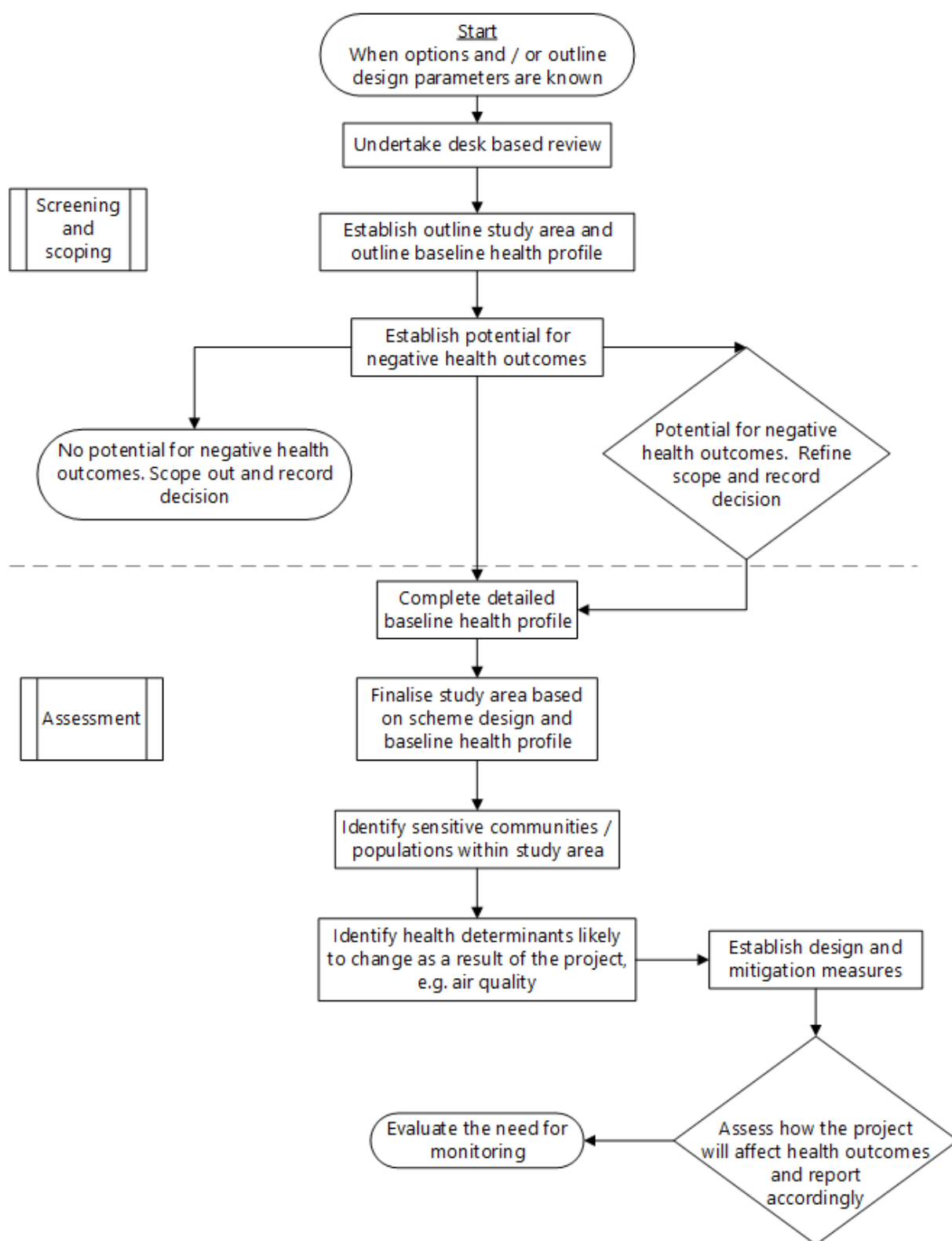
Reporting

3.35 Health effects shall be assessed during construction and up to year 15 of operation (future year scenario).

NOTE After year 15 of operation, population and health effects associated with routine maintenance operations are unlikely to be significant.

3.36 The design and assessment shall follow the process illustrated in Figure 3.36.

Figure 3.36 Human health assessment and reporting process



4. Monitoring

- 4.1 Monitoring requirements for population and health effects shall be discussed and agreed with the Overseeing Organisation and/or (where applicable) the competent authority.
- 4.2 Duplication of monitoring requirements for effects associated with other environmental topics shall be avoided.

NOTE Mitigation for population and health are likely to comprise measures that are integral to the project design or have been implemented to reduce effects associated with other environmental factors.

5. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	2014/52/EU, 'Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment'
Ref 2.N	legislation.gov.uk. DDA 1995, 'Disability Discrimination Act 1995'
Ref 3.N	Highways England. LA 104, 'Environmental assessment and monitoring'
Ref 4.N	Highways England. LA 101, 'Introduction to environmental assessment'
Ref 5.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 6.N	Highways England. LA 103, 'Scoping projects for environmental assessment'
Ref 7.N	Highways England. LA 102, 'Screening projects for Environmental Impact Assessment'
Ref 8.N	Highways England. GG 142, 'Walking, cycling and horse-riding assessment and review'

6. Informative references

The following documents are informative references for this document and provide supporting information.

Ref 1.I	IEMA. IEMA health in EIA, 'Health in Environmental Impact Assessment: A primer for a proportionate approach, 2017'
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