

# Humber Zero Environmental Statement Volume I: Main Chapters

VPI Immingham and Phillips 66 Limited

February 2023

## Quality information

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## List of Abbreviations

Abbreviation	Definition
AADT	Average Annual Daily Traffic
AAWT	Annual average weekday traffic (for the 18-hour period between 06.00 – 24.00)
ACoP	Approved Code of Practice
ADMS	Atmospheric Dispersion Modelling System
AELs	Achievable Emissions Levels
AERA	Air Emissions Risk Assessment
AGL	Above Ground Level
AIL	Abnormal Indivisible Load
ALARP	As Low As Reasonably Practicable
ALC	Agricultural Land Classification
AMEP	Able Marine Energy Park
AOD	Above Ordnance Datum
APIS	UK Air Pollution Information System
AQMA	Air Quality Management Area
AQS	Air Quality Standards Regulations 2010 (as amended)
ATC	Automated Traffic Counts
BAT	Best Available Techniques
BAT-AEL	Best Available Technique – Achievable Emission Level
BEIS	Department for Business, Energy and Industrial Strategy
BEMP	Biodiversity Enhancement and Management Plan
BGL	Below Ground Level
BGS	British Geological Survey
BLA	Broad Landscape Areas
BNG	Biodiversity Net Gain
BNL	Basic Noise Level
BPM	Best Practicable Means
BRE	Building Research Establishment
BRef	Best Available Technique Reference Document
BRES	Business Register and Employment Survey
BS	British Standard
BSI	British Standards Institute
BTO	British Trust for Ornithology
C&D Waste	Construction and Demolition Waste
CAA	Civil Aviation Authority
CAMS	Catchment Abstraction Management Strategies
CAT	Cable Avoidance Tool
CBR	California Bearing Ratio
CCC	The Climate Change Committee
CCR	Climate Change Resilience
CCRA	Climate Change Risk Assessment
CCS	Carbon Capture and Storage
CCUS	Carbon Capture Usage and Storage
CDM	Construction (Design and Management) Regulations 2015

CDOIF	Chemicals and Downstream Oil Industries Forum Guidelines
CEA	Cumulative Effects Assessment
CEH	Centre for Ecology and Hydrology
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger
CFA	Continuous Flight Auger
CGS	Clean Growth Strategy
CHIA	Cultural Heritage Impact Assessment
CHP	Combined Heat and Power
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2e</sub>	Carbon Dioxide Equivalent
CoCP	Code of Construction Practise
COMAH	Control of Major Accident Hazards
CoPA	Control of Pollution Act 1974
COSHH	Control of Substances Hazardous to Human Health
CRTN	Calculation of Road Traffic Noise
CS	Core Strategies
CSC	Countryside Design Summary
CSM	Conceptual Site Model
CSW	clean surface water
CTMP	Construction Traffic Management Plan
CWTP	Construction Worker Travel Plan
DBA	Desk-Based Assessment
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DEMP	Decommissioning Environmental Management Plan
DfT	Department for Transport
DLUCH	Department for Levelling Up, Communities and Housing
DMRB	Design Manual for Roads and Bridges
DO	Dissolved Oxygen
DoWCoP	Definition of Waste: Development Industry Code of Practice
DPD	Development Plan Document
DQRA	Detailed Quantitative Risk Assessment
DTM	Digital Terrain Model
DWS	Drinking Water Standards
EA	Environment Agency
EAL	Environmental Assessment Level
EC	Evaluation Criteria
EclA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIIs	Energy Intensive Industries

ELV	Emission Limit Values
EMS	Environmental Management Systems
EMS (in ecology context only)	European Marine Site
EPA	Environmental Protection Act
EPC	Engineering, Procurement and Construction
EPR	Environmental Permitting Regulations
EQS	Environmental Quality Standards
ES	Environmental Statement
ESL	Ecological Services Limited
ETI	Energy Technologies Institute
ETP	Effluent Treatment Plant
EU	European Union
EVs	Electric Vehicles
EWC	European Waste Catalogue
EWP	Energy White Paper
FCC	Fluid Catalytic Cracker
FEED	Front End Engineering Design
FRA	Flood Risk Assessment
FWEP	Flood Warning and Evacuation Plan
GCN	Great Crested Newt
GCR	Geological Conservation Review
GHG	Greenhouse Gas
GPA	Good Practice Advice
GPP	Guidance for Pollution Prevention
GPR	Ground Penetrating Radar
GQRA	Generic Quantitative Risk Assessment
GT1	Gas Turbine 1
GT2	Gas Turbine 2
GWDTE	Groundwater Dependant Terrestrial Ecosystems
Ha	Hectares
HE	Historic England
HE	Highways England
HEO	Historic Environment Officer
HER	Historic Environmental Record
HGV	Heavy Goods Vehicle
HHRA	Human Health Risk Assessment
HLCP	Humber Low Carbon Pipelines
HMSO	Her Majesty's Stationary Office
HMWGS	Halton Marshes Wet Grassland Scheme
HRA	Habitats Regulations Assessment
HSC	Hazardous Substances Consent
HSE	Health and Safety Executive
HVO	Hydrotreated Vegetable Oil
IAQM	Institute of Air Quality Management
IBCs	Intermediate Bulk Containers
ICCI	In-combination Climate Change Impact

IDB	Internal Drainage Boards
IEA	Institute of Environmental Assessment
IED	Industrial Emissions Directive
IEMA	Institute of Environmental Management and Assessment
IEMA Guidance	'IEMA guide to: Materials and Waste in Environment Assessment, Guidance for a Proportionate Approach'
IPCC	The Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
Km	Kilometre
LCA (in landscape context only)	Landscape Character Areas
LCA	Lifecycle Analysis
LCC	Lincolnshire County Council
LCRM	Land Contamination Risk Management
LDF	Local Development Framework
LEP	Local Enterprise Partnership
LERC	Lincolnshire Environmental Records Centre
LFRMS	Local Flood Risk Management Strategy
LGS	Local Geological Sites
LGV	Light Goods Vehicles
LHA	Local Highway Authority
LLFA	Lead Local Flood Authorities
LLT	Local Landscape Types
LNR	Local Nature Reserve
LOAEL	Lowest Observable Adverse Effect Level
LPA	Local Planning Authority
LSE	Likely Significant Effects
LSOA	Lower Super Output Area
LT	Landscape Types
LWS	Local Wildlife Site
m	Metre
MA&D	Major Accidents and Disasters
MAHP	Major Accident Hazard Pipeline
mAOD	Metres Above Ordnance Datum
MC	Material Change
MEA	Mono-ethanolamine
MHCLG	Ministry of Housing, Communities, and Local Government
MMP	Materials Management Plan
MPA	Mineral Products Association
MPAs	Minerals Planning Authorities
MSA	Mineral Safeguarding Areas
MTPA	Megatonnes per annum
MVR	Mechanical Vapor Recompression
NAQS	National Air Quality Strategy
NCA	National Character Area
NDC	Nationally Determined Contribution
NDMA	N-nitrosodimethylamine

NE	Natural England
NEL	North-East Lindsey
NELC	North East Lincolnshire Council
NERC	Natural Environment and Rural Communities Act 2006
NGR	National Grid Reference
NH <sub>3</sub>	Ammonia
NHLE	National Heritage List for England
NIC	National Infrastructure Commission
NIHHS	Notification of Installations Handling Hazardous Substances
NIS	National Infrastructure Strategy
NKM	North Killingholme Marshes
NLC	North Lincolnshire Council
NLHLC	North Lincolnshire Historic Landscape Characterisation
NLS	National Library of Scotland
NNR	National Nature Reserve
NO <sub>2</sub>	Nitrogen Dioxide
NOAEL	No Observed Adverse Effect Level
NOEL	No Observed Effect Level
NO <sub>x</sub>	Oxides of Nitrogen
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NPSs	National Policy Statements
NRHE	National Record of the Historic Environment
NRSWA	New Roads and Street Works Act
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptors
NTS	Non-Technical Summary
NVZ	Nitrate Vulnerable Zone
OCGT	Open Cycle Gas-Turbine
OMS	Open Mosaic Habitat
ONS	Office for National Statistics
OS	Ordnance Survey
OWS	Oily Water Sewer
PBDE	Polybrominated Diphenyl Ethers
PC	Process Contributions
PCC	Post-Combustion Carbon Capture
PCL	Potential Contaminant Linkages
PEA	Preliminary Ecological Appraisal
PEC	Predicted Environmental Concentration
PFOS	Perfluorooctane sulphonate
PIA	Personal Injury Accident
PINS	Planning Inspectorate
PM <sub>10</sub> and PM <sub>2.5</sub>	Particulate matter (of 10 and 2.5 micrometres (µm) diameter or less, respectively)
PPE	Personal Protective Equipment
PPG	Planning Practice Guidance

PPG-N	The PPG noise guidance
PPM	Parts per Million
PPV	Peak Particle Velocity
PRoW	Public Right of Way
PSR	Pipelines Safety Regulations
PV	Photovoltaic
RBMP	River Basin Management Plans
RCPs	Representative Concentration Pathways
RIGS	Regionally Important Geological Sites
RoFfSW	Risk of Flooding from Surface Water
SAC	Special Area of Conservation
SAF	Sustainable Aviation Fuel
SCR	Selective Catalytic Reduction
SFRA	Strategic Flood Risk Assessment
SHBSES	South Humber Bank Strategic Employment Site
SHE	Safety, Health and Environment
SNCI	Sites of Nature Conservation Importance
SNRHW	Stable Non-Reactive Hazardous Waste
SO <sub>2</sub>	Sulphur Dioxide
SOAEL	Significant Observed Adverse Effect Level
SPA	Special Protection Area
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
SPL	Sound Pressure Levels
SPMP	Site Protection and Monitoring Plan
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SuDS	sustainable drainage systems
SWL	Sound Power Levels
SWMP	Site Waste Management Plan
T&S	Transport and Storage
TA	Transport Assessment
TCPA	Town and Country Planning Act
TTWA	Travel to Work Area (indicates an area where the population would generally commute to a larger town, city or conurbation for the purposes of employment)
UAEL	Unacceptable Adverse Effect Level
ug/m <sup>3</sup>	Microgram per meter cubed
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordnance
VDV	Vibration dose value
VPI	VPI Immingham LLP
WAC	Waste Acceptance Criteria
WBCSD	World Business Council for Sustainable Development
WCA	Wildlife and Countryside Act
WDA	Water Discharge Activity

WeBS	Wetland Birds Survey
WetESP	Wet electrostatic precipitator
WFD	Waste Framework Directive
WFD	Water Framework Directive
WHO	World Health Organisation
WPAs	Waste Planning Authorities
WRAP	Waste and Resources Action Programme
WRI	World Resources Institute
WTT	Well to Tank
ZCH	Zero Carbon Humber
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

## List of Terms

Term	Definition
A-weighting LA or LpA, LWA,	<p>The human ear does not sense all frequencies of sound equally. Our sensitivity is at a maximum at around 2 kHz and steadily decreases above and below. Below 20 Hz and above about 20 kHz we can't hear at all.</p> <p>Within its operating limits a precision measurement microphone measures all frequencies the same so the output it produces does not reflect what we would actually hear. The A-weighting is an electronic filter that matches the response of a sound level meter to that of the human ear. When A-weighted the Sound Pressure Level Lp becomes LpA (or LA) and the Sound Power Level LW becomes LWA.</p>
Aquifer	<p>An aquifer is a geological formation which can contain or transmit groundwater. The type of aquifer indicates how permeable it is, its capability to store/yield significant quantities of water and also whether its quality is suitable for potable water supply</p>
Attenuation	<p>amount by which sound or vibration is reduced when passing through a structure or system; also used to refer to holding of surface water on site to manage the rate of discharge off site-</p>
barg	<p>A barg is a unit of gauge pressure.</p>
Baseline conditions	<p>Existing conditions and past trends associated with the environment in which a proposed activity may take place</p>
Broadband sound	<p>In engineering acoustics the word frequency rather than pitch tends to be used when describing the characteristics of a sound. The unit of frequency is the Hertz (Hz), which is the number of pressure fluctuations per second.</p>
Clean Growth Strategy	<p>The CGS sets out the aims of the Government to deliver increased economic growth while reducing carbon emissions</p>
Conceptual Site Model	<p>A representation of the characteristics of the site and indicates potential source areas of contamination, pathways and receptors (including human health, groundwater, surface water, ecology and buildings / infrastructure). It is used to identify potentially complete source-pathway-receptor (S-P-R) contaminant linkages</p>
Cumulative effects	<p>Combined effects of multiple developments or the combined effect of individual impacts (e.g. where different project elements in different locations have a cumulative impact on a particular feature)</p>
Dangerous substance	<p>A substance which presents flammable, toxic or explosive hazards to people, or which is dangerous to the environment</p>
Decibels (dB)	<p>The decibel is not a true measurement unit nor is it exclusive to acoustics.</p> <p>The decibel is a logarithmic ratio of two values of a variable. Decibels are used because they can represent very wide ranges of ratios (from trillionths and billionths to billions and trillions) with a small range of decibel values. Decibels can be used to represent measured values by using a known reference value in the ratio. When using decibels to measure something it is therefore important to specify what variable is actually being measured and what reference level has been used. This is done by adding a reference value statement in the form “dB re x units”, where the units indicate the variable being measured and x is the reference value.</p> <p>Decibels are used in acoustics because the human ear responds to sound in a logarithmic way and the quantities measured in acoustics vary over wide ranges. However, decibels are used in acoustics to measure several different things which it is important not to confuse with each other.</p>

To avoid confusion there is a notation system that identifies what a decibel value is for. The notations take the form of an italic capital letter and some subscript characters. The capital identifies the general type of value and the subscripts give specific details of what is being represented.

Lxxx denotes a level (ie a value measured in dB by comparison with a reference value);

Dxxx denotes a difference between two levels;

Rxxx denotes a rating (or index), which is measure of the generalised acoustic performance of a material or construction based on a difference between two levels;

Cxxx denotes a correction (or constant)

Of these only those with L notations require a reference value statement. Those with D or R notations are effectively ratios of two measured values not one measured value and a reference value and those with C notations are not based on reference values at all. A reference value statement therefore has no meaning when describing D, R and C decibels.

Because decibels are logarithmic they have to be added, subtracted, multiplied, divided and averaged using different techniques from normal numbers.

Effect	Used to describe the result of an impact on a receptor e.g., loss of grassland may result in loss of ground nesting bird habitat. Effects will be described using standard terminology (major/ moderate/ minor/ neutral and adverse/ beneficial).
EIA Regulations	The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended)
Geotechnical data	Properties of soil and/or rock which are used in engineering design
Glacial Till	Unsorted and unstratified material deposited by glacial ice
Groundwater	Water present beneath Earth's surface in rock and soil pore spaces and in the fractures of rock formations
Hazard	A substance, operation or piece of equipment which has the potential to cause harm to people or the environment
HP CO <sub>2</sub> Compression Station	High pressure carbon dioxide booster compression station. There will be one of these for each PCC Plant, compressing the carbon dioxide to the correct pressure for injection into the carbon dioxide gathering network.
Illustrative viewpoints	Viewpoints chosen specifically to demonstrate a particular effect or specific issues.
Impact	Changes or perturbations arising from the Proposed Development e.g., loss of area of grassland. Where relevant, impacts will be considered on the basis of their magnitude, duration and reversibility
Impulsive sound	Any sound can be defined by its frequency content. Some sounds comprise just one discrete frequency (tonal sounds). Others are distributed over wide frequency ranges (broad band sound). Impulsive sounds are made up short pulses of high frequency components. Sources often produce all of these types of sound at the same time.
Indicator	A value used to indicate the likelihood of a particular response of effect eg. L10,18hr is an index based on statistical processing of sound pressure data that is used as an indicator for road traffic noise response.
Landscape	An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.
Landscape effects	Effects on landscape as a resource in its own right.
Leq,T LAeq,T T = measurement time eg. LAeq,5min	The equivalent continuous sound pressure level over period T (Leq,T), The A-weighted equivalent continuous sound pressure level over period T (LAeq,T).

This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the Leq is not a simple arithmetic mean value.

The Leq is calculated from the raw sound pressure data. It is not appropriate to include a reference to the FAST and SLOW time constants in the notation

Level	Used solely to describe values measured in decibels
Lmax LAmax LAFmax	The maximum instantaneous sound pressure level (Lmax), The A-weighted maximum instantaneous sound pressure level (LAmax) The A-weighted maximum instantaneous sound pressure level with a FAST time constant (LAFmax). This is the highest instantaneous sound pressure level reached during a measurement period.
Lmin , LFmin	The opposite of the Lmax is the minimum instantaneous sound pressure level or Lmin etc. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.
LN,T LAN,T LAFN,T N = %age value, 0100 T = measurement time eg. LA90, LA10, LAF90, 5 min	The percentage exceedence sound pressure level (LN,T), The A-weighted percentage exceedence sound pressure level (LAN,T), the A-weighted percentage exceedence sound pressure level with a FAST time constant (LAFN,T). This is the sound pressure level exceeded for N% of time period T. eg. If an A-weighted level of x dB is exceeded for a total of 6 minutes within one hour, the level will have been above x dB for 10% of the measurement period. This is written as LA10,1hr = x dB. LA0 (the level exceeded for 0 % of the time) is equivalent to the LAmax and LA100 (the level exceeded for 100 % of the time) is equivalent to the Lamin. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.
Loudness	The human perception of the level of sound
Lp LpA (or LA)	The instantaneous sound pressure level (Lp) The A-weighted instantaneous sound pressure level (LpA or LA) This is the root mean square size of the pressure fluctuations in the air. This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125 s (FAST time constant) or the previous 1 s (SLOW time constant).
LAF, LAS	The letters F or S are added to the subscripts in the notation to indicate when the FAST or SLOW time constant has been used. These are often omitted but it is good practice to include them.
Made Ground	Disturbed soils which include man-made or artificial materials
Nitrate Vulnerable Zone	Areas designated as being at risk from agricultural nitrate pollution
Noise	Has no strict definition and is often used interchangeably with sound however it is usually taken to mean unwanted sound
PCC Plant	Post-Combustion Carbon Capture Plant
Phillips 66 Site	The planning application boundary for the Proposed Phillips 66 Development. Largely within the operational Humber Refinery, accessed from Eastfield Road, but also includes land to the east of the Refinery for pipeline and cable connections, including part of the railway line between the Port of Immingham and Ulceby which will need to be traversed by pipelines and cables.

pitch, frequency tonal sound	The sound we perceive can have different characteristics. These can range from low-pitched hums to high-pitched squeals and impulsive sounds.
Ramsar	Wetlands of international importance designated under the Ramsar Convention
Representative viewpoints	Viewpoints that represent the experience of different types of visual receptor.
Risk	Risk is defined using a combination of the severity of a risk and the probability of a risk.
Site of Special Scientific Interest	An area of land which is of special interest for its flora, fauna, geological, geomorphological or physiographical features
sound	is used to describe the physical phenomenon of the transmission of energy through gaseous or liquid media via rapid fluctuations in pressure.
Sound Pressure Level Lp	This is the basic measure of how much sound there is at a given location. It is a measure of the size of the pressure fluctuations in the air that we perceive as sound. Sound Pressure Level is expressed in decibels with a reference level of 20 $\mu$ Pa (Lp in dB re 20 $\mu$ Pa)
Special Area of Conservation	A designated area protecting one or more habitats or species listed in the Habitats Directive
Specific viewpoints	Key and sometimes promoted viewpoints within the landscape.
Susceptibility	The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.
The Applicants	VPI Immingham LLP and Phillips 66 Ltd
The Applications	Planning applications for the construction, operation and maintenance of two proposed Post-Combustion Carbon Capture developments and associated facilities located at VPI's Combined Heat and Power Plant and Phillips 66's Humber Refinery.
The CHP Plant	The existing VPI Immingham Combined Heat and Power Plant
The Phillips 66 Site	The planning application boundary for the Proposed Phillips 66 Development. This is largely within the Humber Refinery, but also includes an area of Network Rail land for crossings over an existing pipe bridge, and an area to the north-east of the Network Rail railway line for connections.
The Proposed Developments	The collective term for the Proposed Phillips 66 Development and the Proposed VPI Development together
The Proposed Phillips 66 Development	PCC retrofit to the Fluid Catalytic Cracker (FCC) stack at the Humber Refinery
The Proposed VPI Development	PCC retrofit to two gas turbines (GT1 and GT2) and two auxiliary gas boilers at the VPI Immingham CHP Plant
The Refinery	The Phillips 66 Ltd Humber Refinery
The Sites	The collective term for the VPI Site and the Phillips 66 Site together
The VPI Site	The planning application boundary for the Proposed VPI Development. This is within and immediately to the south of the operational VPI Immingham CHP Plant, accessed from Rosper Road and separated from the Humber Refinery by the Network Rail railway line.
Tidal Flat Deposits	Soil deposits formed from mud flats in the intertidal zone
Unproductive Strata	Soil and/or rock layers with low permeability that have negligible significance for water supply or base flow for rivers
vibration	is used to describe the transmission of energy through solid media by oscillation

Visual effects	Effects on specific views and on the general visual amenity experienced by people.
weighted	values modified to reflect sensitivities at particular frequencies.

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