City of London Corporation

Net Zero Design Standard Tracker
23/06/2023

Project Name:	
Asset type:	
Class:	
Value:	
Current RIBA Stage:	
Number of Sub-categories completed:	

DRAFT

ARCADIS Design & Consultancy for natural and built assets

Pass

Category and Sub-categories	Criteria	Project Requirement	Completed? (Y/N / N/A)	Information Requirement	Completed? (Y/N / N/A)	KPIs met? (Y/N / N/A)	Process Requirements met in RIBA 1?	Process Requirements met in RIBA 2?	Total credits for Excellent	Process Requirements met in RIBA 3?	Process Requirements met in RIBA 4?	Process Requirements met in RIBA 5?	Process Requirements met in RIBA 6?	Process Requirements met in RIBA 7?	Comments / Validation statement for criteria not met	
Minimise carbon	Minimise pollution	Air pollution Monitoring & Plans 1. The City Corporation will monitor air quality to assess compliance with Air Quality Limit. 2. Nitrogen dioxide monitoring – continuous analysers will be used to monitoring Nitrogen dioxide levels, producing average hourly readings. These will be calibrated twice a year. 3. Data will also be collected from diffusion tubes across 100 locations in the square mile to compare levels to the annual mean limit value and detecting hot spots. 4. Pollutant alerts with messages for City Air Smart Phone app based on air quality data when pollutant levels are high. 5. Annual assessments of air quality to ensure levels are within the guidelines. 6. Develop a plan for reducing the air quality impact on days of high and very high air pollution. 7. Develop a logistics approach that avoids deliveries during peak congestion and pedestrian footfall times. 8. All new developments to be air quality neutral as a minimum and developments subject to an Environmental Impact Assessment to be Air Quality Positive in line with the requirements of the emerging London Plan.		Minimise Pollution Low Zero Carbon Technology options												**1. Whole Life Carbon Assessment**
		Air Pollution City of London Transport 1. Ensure that subject to operational requirements, 100% of vehicles owned or leased by the City Corporation are electric or hybrid by 2025. 2. Require electric or hybrid vehicles as a default for the Corporate taxi contract, together with annual emission reduction targets. 3. Require zero emission and electric or hybrid vehicles as a default for courier contracts, together with annual emission reduction targets. 4. Have an entirely zero emission fleet by 2037 at the latest.														
Circular economy	Circular economy	A Circular Economy Statement should be submitted, to demonstrate: •How all materials arising from demolition and remediation works will be re-used and/or recycled. •How the proposal's design and construction will reduce material demands and enable building materials, components and products to be disassembled and re-used at the end of their useful life. •Opportunities for managing as much waste as possible on site. •Adequate and easily accessible storage space and collection systems to support recycling and re-use. •How much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy. •How performance will be monitored and reported.		Circular Economy Statement.												2. Circular Economy
	Design Principles	1. Maximise re-use: re-use the existing asset, recover materials and products on site or from another site, share materials or products for onward re-use. 2. Design for optimisation: longevity, flexibility, adaptability .assembly, disassembly, and recoverability. 3. Use standardisation: Designing and constructing buildings that apply standardised elements or modular designs for materials and products that enable a reduction in construction waste and easier re-use in next life. 4. Product as a service: Establish and promote a payment structure through which customers have unlimited access to resources but only pay for what is used, or for the result linked to their use. This represents a transition from selling products to selling services. 5. Minimise impact and design waste out: use low impact new materials, use recycled content or secondary materials, design out waste, and reduce construction impact.														
	Building in Layers	1. RICS New Rules of Measurement (NRM) form the basis of CE statement reporting, outline application stage in the Bill of Materials Building layers and their life span: •the NIBM 2														
Decommissioning	Adaptable Design	1. Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios, followed by recommendation and solutions covering: •Options for multiple building uses and area functions based on design details, e.g. modularity. •Routes and methods for major plant replacement, e.g. networks and connections have flexibility and capacity for expansion.		Circular Economy Statement. Fuctional adaptability Strategy												
	Demolition	1. Complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition to determine how all materials arising from demolition and remediation works will be re-used and/or recycled. The audit must account for emissions associated with decommissioning and could be completed as part of the Circular Economy Statement.														
Resource efficicency	Materials	1. The waste hierarchy should be followed to firstly prevent waste being generated, preparing for re-use, recycling, recovery and finally disposal. 2. Follow the Circular Economy principles for New Builds: waste reduction is planned from the project inception to completion, re-using secondary products and materials. 3. Follow the Circular economy hierarchy for existing buildings: Retain, Refit, Refurbish, Reclaim/re-use, Remanufacture, Recycle. 4. Follow the Decision Tree for Design approaches for existing structures/buildings.	N/A	Circular Economy Statement. Site Waste Management Plan												
	Design	1. Review opportunities for re-use and retention of existing buildings in line with the Decommissioning Category requirements. 2. Architect shall undertake feasibility on building retention and re-use and advise whether brief can be met by using existing building. 3. Undertake pre-demolition / pre-refurbishment audit inline with Decommissioning Category requirements. This will help identify which building elements need to be replaced and therefore assessed from an embodied carbon perspective. 4. All buildings should be designed to allow for future adaptation and change of function in line with the principles of a Circular Economy, Design Principles to extend their life.														
	Construction	1. Encourage waste minimisation and waste prevention through the re-use of materials and using fewer resources in the production and distribution of products. 2. Meet the target for construction and demolition waste of 95 per cent re-use/recycling/recovery.														
Low impact materials	Re-use/Recycle	1. Identify re-used or recycled materials and aim for at least 20% recycled or re-used content. 2. Re-use materials from demolished buildings and design future buildings for disassembly, to allow for materials to be re-used. 3. Circular economy statements need to demonstrate how materials resulting from demolition and remediation works will be re-used/recycled.		Materials Management Plan Site waste management plan												3. Materials
	Sourcing materials	1. Use low-carbon building materials such as low-carbon cement. 2. Sustainably sourced materials to be used in construction. 3. Carry out material efficiency review to determine whether all materials proposed are necessary. 4. Specify and use Locally source materials. 5. Ensure longevity of materials.		Responsible sourcing certificates												
Procurement of materals	Construction	1. Undertake a pre-demolition / pre-refurbishment audit to identify opportunities for building (or building components) re-use. 2. Use a sustainable procurement plan that covers the following as a minimum: •Procure construction products locally where possible. •Include sustainability aims, objectives and strategic targets to guide procurement activities. •Identify the risks and opportunities of procurement against a broad range of social, environmental and economic issues.		Bill of Materials. Circular Economy Statements Following CoLC Procurement Code												
Material durability	Design	1. Design for adaptability or flexibility. 2. Design for disassembly. 3. Design to avoid a premature end of life for all components through considering maintenance and durability. 4. Design to prevent water damage.		Development of material durability optioneering throughout RIBA stages												
	Re-use	1. Undertake a pre-demolition / pre-refurbishment audit to identify opportunities for building (or building components) re-use. 2. If re-use is not possible, materials may be carefully and selectively separated for processing and recycling into new elements, materials, and objects.														
Modern methods of construction	Modern methods of construction	1. Include the type of MMC that will be deployed within the delivery programme inline with the GLA guidelines. 2. Disclose whole life carbon performance at in use stage.		Development of modern methods of construction optioneering throughout RIBA stages												
Climate Change	Overheating	1. Solar shading to prevent solar gain through glazing. 2. High thermal mass of building fabric to moderate temperature fluctuations. operate cooling stations 3. Passive ventilation and heat recovery - elemental approach to buildings that cannot be sufficiently retrofitted to get as close to passivhaus standards as possible. 4. Cool streets programme, pedestrian tunnels 5. Heat resilient public realm and highway surfaces. 6. Minimise contribution to the urban heat island effect. 7. Self-standing structures such as canopies and shade sails. 8. Incorporate pools and fountains in the public realm to increase cooling effect. utilise seawtaer / riverwater cooling as appropriate 9. Improving air tightness of buildings that are mechanically ventilated / cooled, minimises how hard the mechanical units need to work to maintain temperatures. 10. Consider painting external facades and roofs with paints that reflect solar radiation. 11. Phase Change Materials - store and release energy in the form of latent heat to reduce reliance on mechanical cooling systems. 12 Prioritise cooling to specific areas only - work with building occupiers to agree plans to only occupy and operate specific cool areas during high heat days, and adjust all services to operate in specific areas only. Also oversize cooling systems. 13. Live information of internal conditions 14. Reflective window films and photochromic glazing, reduction of window sizes on south/east/west facades. 15. Integrate Adiabatic Cooing - direct spraying water into ventilation systems 16. Greening of publicn spaces, tree planting, green roofs / walls		Asset identification Sustainability Statements Risk Assessment and risk workshop Confirmation of intervention measures designed in and installed / implemented (drawings, specifications, photpgraphs, etc.) Flood Risk Assessment												
	Flooding	1. Flood risk assessment and mitigation. 2. Sacrificial land and/or natural flood risk management areas. 3. Flood defence assets maintenance and management regimes - protect key assets, critical infrastructure and sensitive equipment in flood zones. 4. Sustainable rain and surface water management policies and implementation e.g. rainwater attenuation and SuDS. 5. SuDs e.g., infiltration trenches, soakways, swales, natural detention basins, geocellular storage systems, biosolar roofs, glue green roofs, pervious pavements, rain gardens. 6. Rainwater harvesting - added benefit of reducing water consumption.														
	Other adaptation measures	1. Improving Blue/Green Infrastructure. 4. Biodiversity protection and enhancement for wildlife to survive changes in climate. 5. Air quality impact assessment to ensure buildings and services will not contribute to worsening vulnerability to photochemical smog. 6. Building retrofits. 7. Increase the quality and provision of green space and coverage in the Square Mile and wider City Corporation spaces. 8. Introduce climate-resistant and adaptive landscaping. 9. Enhancing monitoring, surveying and tracking of ecosystem health. 10. Strengthen water quality monitoring networks. 11. Mitigate impacts of extreme weather events in line with BREEAM Wst 05 requirements and in line with assessment criteria in BREEAM, with a focus on structural and fabric resilience when applicable. 12. Use of cool materials. 13. Solutions to protect utilities underground, reduces humidity levels within substation buildings. 14. Consider precipitation prevention measures including: - Bio retention swales / rain gardens in open spaces and along wider streets, bio retention planters -Temporary Detention Basins in hard surfaced areas - Smart Underground rainwater harvesting water attenuation tanks - Permeable surfacing and storage, oversized kerb drainage														
	Community resilience	1. Action to tackle food poverty. 2. Support mutual aid and community aid groups. 3. Climate-ready, fortified public health programmes. 4. Strengthen community and business networks to build adaptive capacity. 5. Emergency support and contingency planning for food networks and businesses. 6. Reduce vulnerability by empowering and engaging communities, supportive livelihoods and tackling health inequalities. 7. Cross-boundary and inter-agency working, particularly those to address flood risk, water scarcity and other climate risks with a close link to public health														

Adaptation	Planning & management	1. Develop financial package and programme to manage resilience actions. 2. Embed principles of inclusion and equity throughout all climate action strategies. 3. Mainstream climate resilience into City Corporation governance and decision-making. 4. Identify resilience risks to the Corporation's buildings. 5. Public communications and awareness raising campaigns. 6. Strengthen City Corporation knowledge, skills and capacity. 7. Emergency planning. 8. Continue to fund flood modelling. 9. Develop urban heat vulnerability index and mitigation strategy. 10. Review above and below ground space utilisation in the Square Mile. 11. Ports and markets operational resilience planning. 12. Establish research partnerships to inform future action planning and management of natural capital. 13. Open a City Corporation Ecological Research and Education programme. 14. Pest and disease horizon scanning, surveillance and research programme. 15. Model food supply networks through the Square Mile to inform future planning. 16. Explore and facilitate opportunities to promote regional food production. 17. Review and expand data collection, monitoring and reporting.															
	Thermal Comfort and safety	1. BREEAM Hea 04 – Thermal comfort; Thermal modelling to be carried out in accordance with BRE Hea 04 requirements. 2. The Building should be designed to limit the risk of overheating in accordance with adaptive comfort methodology such as CIBSE TM52 standards.															
		1. Promote occupants activity, comfort and well being by providing quality thermal comfort which reduces heat loss and energy usage. 2. Design alternatives for regularly occupied buildings (dependant on building type); •**L**ocalised active cooling or heating systems. •**P**assive systems such as nighttime air, wind flow. •**I**ndividual thermal controls for at least 50% of individual occupant spaces and option to adjust air temp, radiant temp, air speed and humidity.															
		1. Incorporate mechanical cooling/other cooling in occupied spaces – strategies for this include: •**P**assive Ventilation. •**O**perable Windows. •**E**xterior/Interior Window Shading. •**S**hade Structures. •**I**ncreased Insulation. •**H**igh Performance Windows and Facades. •**S**olar + Storage. •**C**eiling Fans.															
	Designing for heat resilience	1. Select materials and systems using climate change projections to design a heat resilient facility and reduce the risk of overheating such as; •**P**assive daylighting solutions. •**V**ertically stacked double skin facades. •**E**xterior window shades. •**L**ight-coloured exteriors. •**S**haded arcades. •**T**hermally massive materials. 2. Optimise building layout by: •**S**egregating temperature-sensitive electronics and computer control system from other systems. •**P**lacing heat-generating equipment like transformers and switchgear outdoors, where permitted. •**S**plitting the facility cooling loads among different HVAC systems in the facility for redundancy and improved multi-zone control. 3. Identify heat-related points of failure and include design interventions such as ; •**S**electing systems with higher heat tolerance. •**A**dding Energy Recovery Ventilation systems.															
Biodiversity, ecology and conservation	Water quality	(House of Commons Environmental Audit Commitee, water quality in rivers fourth report) 1. Work to improve the quality of local water sources by monitoring pollutant levels, embedding SUDS in projects and reducing the use of pollutants during the construction, use and decommissioning of a site to improve local water quality. This will help to insure key freshwater species like Eels and Barbels are protected.		One or more of the appropriate evidence types listed in the BREEAM Evidential requirements such as Design drawings and professional specialist reports													
		(London sustainable drainage action plan & London Assembly at home with nature Encouraging biodiversity in new housing developments) 1. Protect diversity and encourage biodiversity by, where possible, including onsite green infrastructure such as water retention ponds and ensure all future buildings have sustainable measures as part of normal practice.															
		(London sustainable drainage action plan & London Assembly at home with nature Encouraging biodiversity in new housing developments) 1. Establish,where appropropreate site based treatment and recycling programs															
		Requirements as per Water pollution and monitoring requirments within Pollution Minimisation															
	Planning	(City of London Climte Action Strategy) 1. Introduce land management practices as per the Environment Bill, to show planners a 10% net gain in biodiversity will result before any project is green-lit - dependant on; •**T**he site. •**S**oil management. •**R**educing the removal and re-deposition of soil on site. •**A**ll non-planned paved areas to have sufficient soil depth and quality for growing vegetables. •**O**n or off site tree planting and maximise the ability to remove carbon. •**O**ptimise biodiversity and resilience value.		One or more of the appropriate evidence types listed in the BREEAM Evidential requirements such as Design drawings and professional specialist reports													
		As per BREEAM Land Use & Ecology (LE) credits: 1. The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site. 2. The site is evaluated using the BREEAM Ecological Risk Evaluation Checklist, a Suitably Qualified Ecologist (SQE) carries out survey and evaluation to influence site preparation, works, layouts. 3. Risks and feasibility of enhancement of the sites ecological value is included within the decisions made during site preparation, design and construction works. 4. A section on Ecology and Biodiversity has been included as part of the tenant or building owner information. 5. A landscape and ecology management plan or equivalent has been developed in accordance with BS 42020: 2020 Section 11.1.															
	Mitigating risks	1. Negative impacts from site preparation and construction works are managed according to the mitigation hierarchy and SQEs recommendations as outlined in BREEAM LE03 credit. 2. (LEED) Protect or restore habitat – Preserve and protect from all development and construction activity 40% of greenfield area on the site (if exists). 3. Restore a portion of the site identified as previously disturbed. 4. At least 75% of the proposed development is on previously occupied land, if the land is deemed contaminated, a contaminated land professional undertakes site investigation and confirms that a remediation strategy will be implemented.		One or more of the appropriate evidence types listed in the BREEAM Evidential requirements such as Design drawings and professional specialist reports													
	Ecological change and enhancement	1. Change and enhance ecology by adopting locally relevant ecological measures from recognised local ecological expertise, in collaboration with representative stakeholders. 2. Positive change in ecological value (significant net gain) as a result of the project in accordance with BREEAM and HQM Ecology Calculation methodology. 3. If unable to enhance ecology on site, include measures for the projects zone of influence. 4. Adopt a Biodiversity strategy which incorporates tree planting to address both biodiversity and climate change concerns.This will include discouraging Landscaped areas requiring high irrigation, unless fed by rainwater or grey water collected on site to account for periods of drought due to climate risks. and selecting drought tolerant Species for window boxes . 5. Implement an Urban Greening strategy; green roofs and green walls as appropriate. 6. Long term management and maintenance of ecology throughout the project has been implemented through input from the project team in collaboration with other stakeholders. Detailed management and maintenance plans are included within tenant or building owner information that encourages understanding and supportive behaviours.		Completed BREEAM and HQM Ecology Risk Evaluation Checklist A copy of the Ecological Survey and Evaluation document such as a Phase 1 habitat assessment. Site visits confirming measures have been carried out in-practice in line with SQEs recommendations As-built evidence to show the changes in the BREEAM Change in Ecological value calculator have been carried out as planned in line with SQEs recommendations e.g. as built drawings, photos,SQE sign off.												
Flood resilience	Planning and implementation	1. Mitigate impacts of extreme weather events in line with BREEAM Wst 05 requirements and in line with assessment criteria in BREEAM, with a focus on structural and fabric resilience when applicable. 2. Avoid construction on high flood risk areas inline with LEED LT credit. 3. Ensure compliance with the following CoLC Local Plan Policies: • Section 3.18.1 Core Strategic Policy CS18 : flood risk • Policy DM 18.1 Development in the City Flood Risk Area • Policy DM 18.2 Sustainable Drainage Systems 4. Sewer infrastructure design must allow for projected future sea level rise (SLR) increases in precipitation and frequency of high storm intensity.		Embed resilience measures into our upgrade plans for our owned and operated buildings. Embed a climate resilience lens into all our decision-making. Make the Square Mile public realm more climate change ready through adding in more green spaces, urban greening, flood resistant road surfaces, adaptable planting regimes and heat resistant materials. Reduce the risk of flooding through developing sustainable rain and surface water management policies, resulting in a connected system of water recycling, sustainable urban draining and rainwater management measures.												4. Resilience
	Flood and surface water management	(BREEAM Pol 03 Flood and surface water management) Ensure the following ; •**S**uDs are considered by all developers in new major developments and should, where possible, provide multifunctional benefits. •**T**here is no discharge from the developed site for rainfall up to 5 mm (confirmed by the appropriate consultant). •**A**reas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques. •**A**reas with a high risk of contamination or spillage of substances, such as petrol and oil, have separators (or an equivalent system) are installed in surface water drainage systems. •**C**hemical or liquid gas storage areas have a means of containment fitted to the site drainage system (i.e. shut-off valves). This is to prevent the escape of chemicals to natural watercourses in the event of a spillage or bunding failure. •**A**ll water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as the SuDS manual2 and other relevant industry best practice. They must be bespoke solutions taking account of the specific site requirements and natural or man-made environment of and surrounding the site. •**A** comprehensive and up to date drainage plan of the site will be made available for the building or site occupiers. •**R**elevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place. •**A**ll external storage and delivery areas are designed and detailed in accordance with the current best practice planning guidance.													
		(BREEAM Pol 03 Flood and surface water management) To increase the resilience and resistance of the development to flooding ; 1. The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600 mm above the design flood level of the site's flood zone (see 600mm threshold). 2. The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2017													
	Design	Tree planting 1. Trees can be used as standalone features within soil-filled tree pits, tree planters or structural soils. Tree pits and planters can be designed to collect and attenuate runoff by providing additional storage within the underlying structure (CoL Flood risk assessment, 2017). 2. It is crucial that tree species are chosen for their adaptability to the prevailing site conditions rather than a strict adherence to only native (City of Westminster, 2010). 3. Bringing plants back where construction and high rates of urban growth have removed valuable eco-systems is key to creating sustainable comfortable cities, Urban greening will prevent climate events such as flooding and heat waves.													
		1. Existing surfaces provide a surface suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate through the surface and into underlying layers. 2. Specify surfaces with an aggregate sub-base to provide good water quality treatment before water is infiltrated to the ground, re-used, or discharged to a watercourse or other drainage system.													
		1. Include a rainwater collection basin or a detention basin in the design and as part of the SuDS management system to help with attenuate runoffs and also to address all non-potable water consumptions (such as WC flushing) during construction and operation of the asset. 2. Consider including the following water runoff storage and/or conveyance structures in the design as approperiate: • Infiltration trenches to create temporary subsurface storage of stormwater runoff. • Swales to store and/or convey runoff and remove pollutants. • Soakaways to store or drain the water in large areas such as highways. • Natural Detention basins to remove pollution and reduce runoff downstream. • Bule Green Roofs as a source-control feature • Green Roofs to intercept and retain precipitation, reducing the volume of runoff and attenuating peak flows.													
		1. New developments must be constructed with separate down pipes for foul and surface water which will aid with conversion in the future should new surface water pipes be constructed within the City of London. 2. Site drainage should be designed inline with Thames Water recommendations should only be combined at the final manhole prior to leaving the site and entering the combined sewer.													

		1. Use methods and materials that reduce the impact from a flood, ensuring that structural integrity is maintained, and the drying out and cleaning required, following inundation and before reoccupation, is minimised. 2. Where flood resistance measures are not appropriate, enhance the features of the property so that they resist the ill-effects of flood water and dry out quickly and without permanent damage.													
Local air quality	Transport	1. BREEAM Tra 01 Transport assessment and Travel Plan - No later than Concept Design stage, undertake a site-specific transport assessment (or develop a travel statement) and draft travel plan, which can demonstrably be used to influence the site layout and built form. 2. This should include (where relevant) •**T**ravel patterns and attitudes of existing building users towards sustainable transport methods (cycling, public transport) •**P**redicted travel patterns and transport impact of future building or site users •**C**urrent local environment for pedestrians and cyclists •**N**umber of existing accessible amenities within 500m of the site •**D**isabled access •**E**xisting public transport index •**C**urrent facilities for cyclists 3. Based on the transport assessment develop a travel plan that provides a long term management strategy which encourages more sustainable travel such as negotiating with local bus, train or tram companies to increase local provision, provision of EV charging stations for a minimum of 3kW for at least 10% of the total car parking capacity for the development, provision of parking		Transport Assessment and Travel Plan Marked up drawing showing cyclist facilities locations and details. Confirmation including a formal commitment with targets set and tables / systems of monitoring and reporting energy and CO2 from site activities and transportation of materials and waste. Confirmation of heating and hot water source / plant including specifications, drawings and manufatcurers datasheets. Must show type, NOx emissions, VOCs and PM10 levels. Manufacturers datasheets / confirmations of VOC and formaldehyde and carcinogen levels of all finishes materials.											
		1. BREEAM Tra 02 – Provide Cyclist facilities based on the number of building occupants from the sliding scale of compliance, such as storage spaces, showers, lockers and changing facilities.		Air Quality Assessment												
		1. During construction, where possible, use electric construction vehicles such as excavators, forklifts and loaders from local suppliers. 2. Identify opportunities to purchase electric construction vehicles within the City of London to support with a Transition to a Zero Emission Fleet.		Environmental Impact Assessment Screening Matrix checklist												
		1. Monitor and measure the transport of construction materials to minimise air quality impacts (BREEAM Man 03 Responsible Construction practices); •**E**nsure processes are in place to facilitate collecting and recording feedback from the community and to address any concerns related to the development footprint. •**A**ssign responsibility to an individual for monitoring, recording and reporting transportation data resultng from all on-site construction processes (and dedicated off-site manufacturing) throughout the build programme. •**R**eport the total carbon dioxide emissions (total $kgCO_2$/project value) from the construction process via BREEAM Projects. 2. Set targets for transportation movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum cover: 3. Transportation of materials from the point of supply to the building site, including any transport, intermediate storage and point of supply monitor as a minimum: •**M**aterials used in major building elements. •**G**round works and landscaping materials. •**T**ransportation of construction waste from the construction gate to waste disposal processing or recovery centre gate. This monitoring must cover the construction waste groups outlined in the project's resource management plan. 4. Report separately for materials and waste, the total transport-related carbon dioxide emissions ($kgCO_2$-eq), plus total distance travelled (km).		Confirmation of the installation of air quality monitoring tools Site specific indoor air quality plan Results from post construction on site VOC and formaldehyde testing.											
	Nitrogen Oxides (NOx)	1. All heating and hot water is supplied by non-combustion systems. For example, only powered by electricity. If this cannot be met, ensure the below can be: •**E**nsure appliances installed align with the maximum NOx emissions levels for 2 credits under BREEAM Pol 02 including; o**G**as Boilers, Low and high pollution location – 24mg/kWh. o**O**il Boiler, low pollution location – 67mg/kWh, high pollution location – 50mg/kWh. o**B**iomass and solid fossil fuel boiler, low pollution location 70mg/m3, high pollution location – 50mg/m3. o**G**as heat pump using external combustion, low pollution location – 30mg/kWh, high pollution location – 30mg/kWh. o**O**il heat pump using external or internal combustion/ gas and oil local space heaters/ biomass, solid fuel and wood pellets for closed fronted local space heaters, low pollution location –														
	Fine Particulate Matter	1. BREEAM Pol 02 local air quality – VOC and PM. 2. Ensure appliances (mg/m3) installed align with the maximum VOC and PM10 emissions levels for 2 credits including; •**B**iomass boilers – Low pollution location, PM 11, VOC 5. High pollution location, PM 4, VOC 5 •**S**olid fossil fuel boiler - Low pollution location, PM 17 ,VOC 5. High pollution location, PM 4, VOC 5 •**W**ood pellet closed face local space heater - Low pollution location, PM 22 , VOC 22. High pollution location, PM 10, VOC 10 •**B**iomass and solid fuel closed face local space heater - Low pollution location, PM 25 ,VOC 25. High pollution location, PM 10, VOC 10														
		1. Ensure products align with the exemplary level Formaldehyde and TVOC emissions requirements for BREEAM ; •**I**nterior paints and coatings; Formaldehyde ≤ 0.01 mg/m³, TVOS ≤ 0.3 mg/m³, TSVOC ≤ 0.1 mg/m³. Category 1A and 1B carcinogens; ≤ 0.001 mg/m³. •**W**ood based products including wood flooring; Formaldehyde ≤ 0.02 mg/m³, TVOC ≤ 0.3 mg/m³, TVOS ≤ 0.1 mg/m³, Category 1A and 1B carcinogens; ≤ 0.001 mg/m³. •**F**looring materials (including floor level compounds and resin floor); Formaldehyde ≤ 0.01 mg/m³, TVOS ≤ 0.3 mg/m³, TSVOC ≤ 0.1 mg/m³. Category 1A and 1B carcinogens; ≤ 0.001 mg/m³. •**C**eiling,wall, acoustic and thermal insulation materials; Formaldehyde ≤ 0.01 mg/m³, TVOS ≤ 0.3 mg/m³, TSVOC ≤ 0.1 mg/m³. Category 1A and 1B carcinogens; ≤ 0.001 mg/m³. •**I**nterior adhesive and sealants (including flooring adhesive); Formaldehyde ≤ 0.01 mg/m³, TVOS ≤ 0.3 mg/m³, TSVOC ≤ 0.1 mg/m³. Category 1A and 1B carcinogens; ≤ 0.001 mg/m³.														
		1. Annual Average PM10 value of 20 µg/m³. 2. Development that would result in deterioration of the City's nitrogen dioxide or PM10 pollution levels will be resisted.														
		1. Annual Average PM2.5 value of 10µg/m³.														
	Air Quality Monitoring & plans	1. Undertake an annual assessment of air quality to ensure levels of nitrogen dioxide in 90% of the Square Mile meet health-based Limit Values and WHO Guidelines by 2025.														
		1. Developers are required to provide Air Quality Impact Assessments as applicable.														
		1. Option to follow EIA guidance; development plans may be required to conduct Environmental Impact Assessment Screening Matrix checklist surrounding the possible impacts of the proposed development to air pollution. They may also need to consider: •**W**hat are the observed trends shown by recent air quality monitoring data and what would happen to these trends in light of proposed development and / or allocations. •**T**he impact of point sources of air pollution (pollution that originates from one place). •**T**he potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments, including their implications for vehicle emissions. •**W**ays in which new developments could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example, entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable. •**O**pportunities to improve air quality or mitigate impacts, such as through traffic and travel management and green infrastructure provision and enhancement.														
		1. (DEFRA Air Quality Monioring Methods) Identify, where possible the opportunity to include air quality monitoring tools to be installed at strategic locations in and around the project site such as those which have MCERTS certification.														
	Indoor air quality	1. BREEAM Hea 02 IAQ plan and Post construction indoor air quality measurement: Pre – occupancy •**P**roduce a site specific indoor air quality plan to facilitate a process that leads to design, specification and installation decision around minimising indoor air pollution during occupation of the building. The Indoor air quality plan must consider the following ; o**R**emoval of contaminant sources. o**D**ilution and control of contaminant sources. o**W**here present, consideration is given to the air quality requirements of specialist areas such as laboratories. o**P**rocedures for pre-occupancy flush out. o**T**hird party testing and analysis. o**M**aintaining good indoor air quality in-use. 2. Post Construction indoor air quality measurement. •**T**he formaldehyde concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 100µg/m³ averaged over 30 minutes (World Health Organization guidelines for indoor air quality: Selected pollutants, 2010). •**T**he formaldehyde sampling and analysis is performed in accordance with ISO 16000-2 and ISO 16000-3. •**T**he total volatile organic compound (TVOC) concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 500µg/m³over 8 hours. •**T**he TVOC sampling and analysis is performed in accordance with ISO 16000-5 and ISO 16000-6 or ISO 16017-1. •**W**here levels are found to exceed these limits, the project team confirms the measures that have, or will be, undertaken in accordance with the IAQ plan, to reduce the TVOC and formaldehyde														
Passive design	Analysis	1. As a minimum, the passive design analysis should cover: Site location. •**S**ite weather. •**M**icroclimate. •**B**uilding layout. •**B**uilding orientation. •**B**uilding form. •**B**uilding fabric. •**T**hermal mass or other fabric thermal storage. •**B**uilding occupancy type. •**D**aylighting strategy. •**V**entilation strategy.		Passive design solutions integrated into the design development by the Architect Passivhaus solutions integrated into the design development by the Architect Energy modelling and reporting												
		1. Project team carries out an analysis of existing building fabric, form, site location and outline scheme design to influence decisions made during the Concept Design stage and identifies opportunities for the implementation of passive design solutions and retrofit measures that reduce energy demand. 2. Use passive design measures to reduce total heating, cooling, mechanical ventilation and lighting loads and energy consumtpion in line with results of passive design analysis. 3. Utilise passive HVAC strategies. 4. Provide direct exhaust airflow measurement device and automatic indication devices on all natural ventillation openings intended to meet the minimum opening requirements. 5. Highlight to developers the need for passive heat gain, resulting in smaller, simpler heating and hot water systems. E.g: Prioritise reduced fabric heat loss so that incidental room heat gains can become primary heat source. 6. Ensure that design decisions reflect the energy hierarchy - seek to limit building energy demand through passive measures and efficient fabric design prior to considering systems' optimisation to satisfy demand. 7. Integrate passive design features to mitigate cooling demand into proposals as outlined in the Energy Statement, these are to be applied and elaborated in the design development and reserved matters stages, (in accordance with the Adaptive Pathways Implementation Plan). 8. In accordance with NYC Climate resilience design guidelines all efforts should be made to reduce the Urban Heat Island effect with a minimum of 50% of the projects site area to be shaded, vegaetated and/or high solar reflectance surfaces. As well as passive ventilation design and passive daylight solutions being consciously considered.														
	Heat island effect	Planning and assessments 1. Complete and document a site survey or assessment that includes heat island effect potential •**L**eads to identification of paving, shading, or roofing materials that can be included.(LEED v4/1 Building Design and Construction Site Assessment). 2. Identify key buildings at risk of contributing to the urban heat island. 3. Evaluate sources of heat pollution that contribute to the Urban Heat island including developing strategies relating to; •**W**aste Heat recovery technology. •**E**lectric charging infrastructure for medium and heavy duty vehicles. •**H**VAC controls for intermittent ventilation (New York Design Guide)														
		Roof measures: LEED v4/1 Building Design and Construction Site Assessment 1. Use roofing materials that have an aged SRI equal to or greater than 64 (low sloped roof) and 32 (steep sloped roof). 2. Install a vegetated roof. 3. Parking ; place a minimum of 75% of parking spaces under cover.The roof must have an fed SRI of at least 32,be a vegetated roof or be covered in energy generation systems.														

		Non - roof measures 1. Use existing plant material or install plants that provide shade over paving areas within 10 years of planting. Can include vegetated planters and must be in place at the time of occupancy. 2. Provide shade by structures covered by energy generation systems such as PV and wind turbines - if on a roof is it should have an aged Solar reflectance value of at least 0.28 in accordance with ANSI/CRRC S100. If not on a roof or no information then the initial SR but be at least 0.33. 3. Provide shade with vegetated structures. 4. Use paving materials with an initial SR of at lest 0.33. 5. Use an open-grid pavement system (at least 50 % unbound). 6. A minimum of 50% of the projects site area shall be shade, vegetated and/or high solar reflectance surfaces. 7. Lighter reflective surfaces such as light-coloured coatings, membranes and pavement materials. 8. Provision of trees to provide natura solar shading. 9. Self standing structures such as canopies and shade sails to aid solar shading. 10. Incorporate water bodies such as pools and fountains in the public realm to increase the cooling effect.															
Community engagement	Waste	1. All efforts should be made to assist businesses and residents to reduce the amount of waste they produce and increase the proportion of waste they recycle. 2. CoL committed to improve recycling opportunites in flats as 99% of the square mile is flats, by improving recycling this can contribute to 32% recycling rate by 2025.		Waste reduction techniques and initiatives													5. Wellbeing
	Energy	1. Efforts should be made (through training, monitoring energy consuption and commissioning building services) to ensure that post occuancy EPC A or BREEAM Excellent ratings are not affected by the tenants– also ensure than tenants get involved and play an active part in improving said ratings. 2. Encouraging consumers to tariff switches such as the uptake of smart meters to help the widespread rollout of net zero technologies. 3. Tackle fuel poverty by providing targeted energy efficiency measures and discounts on bills as highlighted within the Energy and Carbon Efficiency section.		Energy monitoring systems and commissioning reports BREEAM In Use Assessment (optional)													
	Travel/ Transport	1. Promote sustainable travel patterns & transport modes 2. Improve conditions for pedestrians and cyclists through better management of the facilities 3. All development proposals must be accompanied by an assessment of transport implications during construction & operation, focusing on; •☐Road dangers •☐Pedestrian environment and movement •☐Cycling infrastructure provision •☐Public transport •☐The street network ☐This helps understand and mitigate the likely impact of the development on transport networks. 4. Loss of a pedestrian route will only be permitted where an alternative public pedestrian route of at least an equivalent standard is provided. Routes of historic importance should be safeguarded. 5. Provide public access across private land where it enhances the connectivity, legibility and capacity of the City's street network. 6. Create new pedestrian rights of way where this would improve movement and contribute to the character of an area. 7. All off-street car parking spaces and servicing areas must be equipped with the facility to conveniently recharge electric vehicles. 8. Designated parking must be provided for Blue Badge holders within developments. For domestic buildings, motorcycle parking must be provided at a ratio of 10 motor cycle parking spaces		Assessment of transport implications Contractor pollution control methods and policies, including minimising light pollution Site investigation with risk assessment and remediation strategy Climate resilient techniques													
	Construction Impact	1. Developers must consider minimising noise pollution arising from site acitivites. Where minimising is not possible, noise mitiigation methods should be implemented e.g restricted operating hours, noise attention methods. 2. Internal and external lighting should be designed to avoid spillage of light beyond what is needed to protect light-sensitive areas such as housing, hospitals, important areas of nature conservation. 3. Where ground work is required, developers must carry out a detailed site investigation to establish site contamination and undertake a risk assessment. Remediating sources of contamination which present an unaccentable risk must be carried out															
	Climate resilience	1. Local communities must be encourged and involved in order to effectively reduce the vulnerability of their area against the impact of climate change. 2. There should be active engagement with tenant and occupiers on resilience issues. 3. Consideration should be given to mitigation of health impacts where overheating may be an issue. 4. Development should aim to improve occupant's internal environment and comfort.														
WELL Building type requirements	Internal Environments	1. Smoke-free environment: •☐Prohibited outdoor smoking at ground level within 7.5 meters of all building air intake. •☐Signage is present to communicate the ban. •☐Prohibited outdoor smoking on decks, patios, balconies, roof tops and other occupied outdoor area above ground level.		Air quality monitoring regime and testing results by Air Quality Consultant. Marked up drawings / photographs showing smoke free areas and signage, along with smoke free policies agreed and adhered to.													
		1. Ventilation Design - one of the following: •☐Mechanically ventilated spaces •☐Newly installed ventilation systems are designed to meet one or more of 90% of the project area. ☐☐ASHRAE 62.1-2010 or any more recent versions (Ventilation Rate Procedure or IAQ Procedure). ☐☐ASHRAE 62.2-2016. ☐☐EN 16798-1. ☐☐AS 1668.2-2012 or any more recent version. ☐☐CIBSE Guide A: Environmental Design, version 2007 or any more recent version. 2. Existing ventilation systems have been tested and balanced to meet supply and exhaust rates set in one or more ventilation guidelines listed above within the last five years. 3. Naturally ventilated spaces: •☐Newly installed ventilation systems are designed to meet one or more of 90% of the project area. ☐☐Natural Ventilation Procedure in ASHRAE 62.1-2010 or any more recent versions. ☐☐EN 16798-1. ☐☐CIBSE AM10: Natural Ventilation in non domestic buildings. ☐☐AS 1668.4-2012 or any more recent version. ☐☐Any reference above, which describes natural ventilation procedures. 4. Vents and windows used to meet the ventilation requirements in one of the standards mentioned above are permanently open or have controls to prevent their closure during periods of		M&E drawings, specifications, datasheets confirming ventilation strategy and monitoring, testing results, and confirmation of relevant / applicable standards met. Contractor conformation of (as applicable): - sealed and proetcted ducts, and cleaning regime / confirmartion completed - replacement of filters, and media filters with a PM10 removal rating - moisture and dust management procedures Marked up drawing / schmatic showing labelled noise zones. Marked up drawings / specifications / photos showing internal spaces with natural materials and planting or water fountain. Confirmation / evidence of meeting the 'connection to place' requirements. Confirmation of universal design / accessibility including in design, policy and operations using drawings, specifications, photos, etc.											
	Construction	Construction Pollution Management: 1. For construction occurring after enrolment or the start of subscription, the following requirements are met: •☐Ducts are maintained per one of the below: ☐☐Ducts are sealed and protected from possible contamination during construction. ☐☐Ducts are cleaned prior to installing registers, grills and diffusers. 2. If permanently installed ventilation system is operating during construction, filters must meet the following: •☐Media filters with a PM10 removal rating of at least 70% (e.g., MERV 8) are used to filter return air. •☐All filters are replaced prior to occupancy. 3. The project implements the following moisture and dust management procedures: •☐Carpets, acoustical ceiling panels, fabric wall coverings, insulation, upholstery and furnishings and other absorptive materials are stored separately in a designated area protected from moisture damage. •☐All active areas of work are isolated from other spaces by sealed doorways or windows or using temporary barriers. •☐Walk-off mats are used at entryways to reduce the transfer of dirt and pollutants.															
	Noise	1. The following requirements are met: •☐An annotated document is submitted and made available to occupants showing labelled zones throughout the project floor plan or similar schematic document as follows: ☐☐Loud zones: includes areas intended for loud equipment or activities (e.g., mechanical rooms, kitchens, fitness rooms, social spaces, recreational rooms, music rooms). ☐☐Quiet zones: includes areas intended for concentration, wellness, rest, study and/or privacy (e.g., restorative spaces, lactation rooms, nap rooms). ☐☐Mixed zones: includes areas intended for learning, collaboration and/or presentation (e.g., auditoriums, classrooms, breakout spaces). ☐☐Circulation zones: includes occupiable areas not intended for regular occupancy (e.g., hallways, egress, atria, stairs, lobbies). 2. If Loud zones directly border Quiet zones, projects provide a plan for reprogramming or mitigating sound transmission between Loud zones and Quiet zones.															
	Mind	Provide connection to nature: 1. The project integrates the following throughout the space, including common circulation routes, shared seatings, and rooms: •☐Natural Materials, patterns, shapes, colours, images or sounds. •☐One of the following: ☐☐Plants e.g., potted plants, planted walls OR ☐☐Water e.g., fountain.															
		Provide connection to place: 1. The project integrates design elements that address the following: •☐Celebration of culture e.g., culture of occupants, workplace, surrounding communities. •☐Celebration of place e.g., local architecture, materials, flora, artists. •☐Integration of art. •☐Human delight.															
	Accessibility	Integrate universal design: 1. The project considers best practices in universal design to accommodate a diverse range of occupant abilities and needs throughout the project, by implementing at minimum one design, operations or policy strategy in each of the following categories: •☐Physical access: entry, exit and key interaction points that enable inclusive entrance and strategies that enable flexible usability of the space to accommodate change as needed. •☐Developmental and intellectual health: strategies that use colour, texture, images and other multi-sensory visually perceptible information (e.g., to accommodate sensory requirements of neurodiverse individuals). •☐Wayfinding: strategies that help individuals intuitively navigate through the project (e.g., signage, tactile maps, symbols, auditory cues, information systems). •☐Operations: operational policies and programs that support inclusion and accommodate a diverse range of needs (e.g., diversity and inclusion training, flexible work hours for individuals with disabilities). •☐Technology: technology (e.g., audio and visual equipment, web access) that helps individuals fully utilise a space (e.g., to assist blind or deaf individuals, or those who do not speak the native language), made available to all occupants at no cost. •☐Safety: strategies that support easy access to all spaces and amenities and minimize risk of injury, confusion or discomfort (e.g., lighting or clear sightlines to increase feelings of security).															
Embodied carbon	Embodied carbon	*Please see sub-category above*		*Please see sub-category above*													6. Post Occupancy Evaluation (POE)
Operational energy and carbon	Post Occupancy performance	*Please see sub-category above*		*Please see sub-category above*													
Energy and water monitoring	Energy Monitoring	1. Appropriate energy monitoring and management systems are installed for the various end-use categories of energy consuming systems. 2. Separate landlord and tenant energy use meters and clearly label meters with serial number and end use. 3. Use a central repository for data that has a minimum of 18 months data storage.		Schematics, drawings, specifications confirming metering strategy, along with the monitoring and management systems. Confirmation of energy use data disclosure, reporting startegy.													
	Water Monitoring	1. Water-consuming plant or building areas, are either fitted with easily accessible pulsed or digital sub-meters or have water monitoring equipment integral to the plant or area.															
	Data Disclosure	1. Disclose energy use data (residential) including: •☐Collect annual building energy consumption and generation. •☐Aggregate average operational reporting e.g. by post code for anonymity or upstream meters. •☐Collect water consumption meter readings. •☐Upload five years of data to GLA and/or CarbonBuzz online platform. •☐Consider uploading to Low Energy Building Database.		Confirmation of data upload to Carbon Buzz or GLA. Copy of DEC													
		1. Disclose energy use data (commercial / Public) including: •☐Carry out an annual Display Energy Certificate (DEC) and include as part of annual reporting. •☐Report energy consumption by fuel type and respective benchmarks from the DEC technical table. •☐For multi-let commercial offices produce annual landlord energy (base building) rating and tenant ratings as well as or instead of a whole building DEC. •☐Upload five years of data to a publicly accessible database such as GLA and/or CarbonBuzz.															
Local air quality	Local air quality	*Please see sub-category above*		*Please see sub-category above*													
WELL requirements	WELL requirements	*Please see sub-category above*		*Please see sub-category above*													