

Crest Nicholson Climate Change Risks & Opportunities Assessment 2019

Driver	Risk type	Risk description	Potential Impact	Timeframe	Direct/ Indirect Impact	Likelihood	Magnitude of Impact (L/M/H)	Financial Implications	How we are responding
Mandates on and regulation of existing products and services	Transition risk	<p>There is a clear understanding that the built environment can have a significant role in helping to minimise the impacts of climate change. In the recent Spring Statement, the Chancellor confirmed that the UK aims to achieve world leading levels of energy efficiency and in 2018 the Government committed to halving energy use in new buildings by 2030. With these ambitions, together with the Government's commitment to achieving net zero carbon emissions by 2050, we are likely to see an increase in requirements for carbon reductions in both operational and homes' in-use performance beyond current levels, which could lead to increased operational costs.</p> <p>It is also important that new homes built are climate resilient and comfortable to live in with temperatures expected to rise. As a result, UK Building Regulations, including Part L (conservation of fuel and power) are likely to be progressively updated.</p> <p>New lower-carbon products and technologies implemented to respond to changing regulatory requirements could be unfamiliar to customers. If their use is unpopular or not communicated adequately (such as why it is important and how they are to be used), it could influence customers' choice of new home and/or their occupancy experience, as well as our reputation.</p> <p>With any changes to regulations, there is a risk of potential disruption in production capacity due to the availability of skills and labour that can effectively build to new requirements. There could also be increased build costs, through both the supply chain introducing new technologies and the need to acquire more skilled labour, to comply with any regulations.</p>	<p>Increased operating costs (e.g., higher compliance costs, increased insurance premiums)</p> <p>Impact on reputation and sales</p>	Medium-term	Direct	More likely than not	Medium	<p>It is uncertain what extra costs would be associated with research, design and build. However, if we estimate that increased consultancy fees would be required at design stage and then additional performance testing of the built homes takes place, we could see a £1,500/plot increase. At current plot numbers (3,000), the cost equals £4,500,000. This increased plot cost would be deductible from the land value.</p> <p>There would also be other costs to consider, such as the cost of any new technologies and the training required to upskill the workforce on their use. As an example, if electric vehicle charging points are required to be installed in all homes, this could be an extra cost of £800 per home, equating to a total of £2,400,000 per year at current plot numbers.</p> <p>Use of new technologies could impact customer experience and if used incorrectly, may increase after-sales costs. Unpopular technologies could also make homes more challenging to sell.</p>	<p>Potential regulatory changes and consultations are reviewed closely by our Group Technical and Quality team as well as our Board-level Technical Committee.</p> <p>We regularly communicate with stakeholders such as the Ministry of Housing, Communities and Local Government (MHCLG), Department for Business, Energy and Industrial Strategy (BEIS), Home Builders' Federation (HBF), UKGBC, and Homes England to understand and influence future changes in regulation. We also partner with Planning Authorities and skilled consultants to achieve consensual cost-effective outcomes.</p> <p>We already have mitigation measures in place to reduce the risk of overheating in our homes. Overheating assessments take place on all developments and dynamic modelling and associated mitigation measures are implemented for plots with a medium- or high-risk of overheating. In the design of our new house type range, we carried out overheating testing and we are also trialling off-site manufacturing (OSM) methods.</p> <p>We are conducting Building Performance and Post Occupancy Evaluation (BPE and POE) on a selection of our new house designs that were built using OSM methods. This will gather information on building comfort and air quality within the home and the findings will be used to inform future designs.</p>
Changing customer behaviour	Transition risk	<p>As stakeholders, including customers, society, investors and employees (including potential employees) become increasingly aware of the negative impacts of climate change, they are likely to increasingly favour companies that are working to mitigate against, and adapt to, climate-related risks.</p> <p>Failure to meet stakeholder expectations could lead to:</p> <ul style="list-style-type: none"> - Increased local government requirements to implement costly adaptation measures. - Challenges to secure planning permission. - Increased customer demand for in-home and development-wide mitigation and adaptation measures. Failure to adapt could result in a decrease in sales. - More challenges to attract and retain staff, particularly younger generation employees, who are seeking to work with companies that 	<p>Reduced demand for goods and/or services due to shift in consumer preferences</p>	Medium-term	Direct	About as likely as not	Medium	<p>Awareness of climate-related issues is increasing across the UK population, with climate change a regular feature in the media. Sustainability and climate change also feature extensively in school syllabuses. However, the business has yet to feel a significant impact from this increasing awareness, and therefore the potential impact on new-build home purchases is very uncertain. To date, only energy efficiency (and sometimes water consumption) are queried by prospective customers in our show-homes.</p> <p>Whilst this is not expected to happen in the immediate future, if our revenue from Open Market sales were to fall by 5%, this would have an impact of approximately £12,000,000, which is the difference between the loss of sales and reduction in cost of sales.</p>	<p>1, Effective technical procedures are in place, including flood and overheating risk assessments. In 2018, 81% of our developments incorporate sustainable urban drainage systems (SUDS). Approximately 11% of homes we built in 2018 were initially assessed as having a medium- or high-risk of overheating. These plots were then subject to dynamic heat modelling to allow mitigation measures to be implemented.</p> <p>2, Core sustainability features are built into the sales' pitch as well as on our corporate website. We ensure that our corporate reporting and website content is transparent about our response to climate change and clearly communicates our leadership, good practice and responsiveness.</p> <p>3, The business demonstrates innovation in build construction to respond to changing consumer</p>

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		<p>demonstrate high levels of social and environmental responsibility.</p> <p>There are now increased expectations from the investment community to demonstrate performance in this area as well as increasing reporting requirements (e.g. Streamlined Energy and Carbon Reporting (SECR) and recommendations from the Task Force on Climate-related Financial Disclosures).</p>							<p>behaviours towards climate change through our new range of house type designs and trials of offsite manufacturing (OSM).</p> <p>4, Our policies and procedures relating to environmental management, climate change, biodiversity, sustainable procurement, diversity and modern slavery are all available in the public domain and are reviewed annually by our Executive Management Team.</p> <p>5, We engage and consult with local communities and the local planning authority throughout the development planning process to ensure the development provides an attractive environment that is resilient to a changing climate.</p>
Increasing energy and water costs through changes in policy and global fuel prices	Transition risk	<p>We use a significant amount of energy as part of our construction work on site, including to power the site compounds and for plant and machinery around site. Global fuel price fluctuations have an impact on our energy and fuel costs, including electricity and diesel.</p> <p>Statistics from the Department for Business, Energy and Industrial Strategy (BEIS) show that the average price of red diesel increased by around 20% between 2017 and 2018 and this was also reflected in our spend on diesel.</p> <p>Global fuel prices also impact costs to our business for waste management on site. In 2018, we produced 150,000yd³ of construction waste, equating to around £3.5m in total waste disposal. When fuel prices increase, waste service providers must increase the cost of their skips to cover their increasing transportation costs. Therefore, we are likely to continue to see the cost of waste disposal per yd³ increase over time.</p> <p>Potential changes to taxes and regulations will also have an impact on our energy and water costs. For example, the Climate Change Levy (CCL) for electricity and natural gas increased by 45% and 67% respectively between 2018 and 2019. The CCL is paid through our energy bills, and directly impacts our margins and operational costs.</p>	<p>Increased production costs due to changing input prices (e.g., energy, water) and output requirements (e.g., waste treatment)</p> <p>Increased operating costs (e.g., higher compliance costs, increased insurance premiums)</p>	Short-term	Direct	Very likely	Medium	<p>According to BEIS, the estimated fossil fuel price increase (using their central figures) will be approximately 25% by 2025 and 50% by 2030. Using the 2025 forecast—and assuming we maintain our current levels of consumption and spend (approximately £3,000,000 per year)—this cost would increase to £3,750,000 per year by 2025.</p> <p>Increasing fuel costs are also impacting our waste collection costs and based on previous years, this could increase by up to 5% per year. If waste generated remains at the same level, the cost in 2025 would be £4,500,000 compared to the current cost of £3,500,000. This cost excludes the potential impact from increasing material costs.</p> <p>Based on the energy consumption data in 2018 and the increased rates of the Climate Change Levy (CCL) from 1st April 2019, the CCL will equate to a cost of over £110,000 per year. This is based on the same consumption of energy as in the 2018 financial year. Compared to the rates in 2018, this is a cost increase of £36,500. The CCL rates are forecast to increase for gas, but reduce for electricity.</p>	<p>We work to minimise and manage increasing construction costs by identifying operational energy efficiency measures on sites through our Make Waste History (MWH) initiative.</p> <p>We participate in the Energy Savings Opportunity Scheme (ESOS) and seek to implement the most beneficial recommendations from the energy audits conducted on our sites as part of the Scheme. ESOS Phase II is underway, and we are awaiting recommendations from our externally appointed auditors. Key actions will likely include improved management of diesel generators on site and the efficiency of our site compounds.</p> <p>Through our MWH initiative, waste dashboards are issued to our site teams that highlight anomalously high waste streams and their associated cost. We run divisional initiatives (trade tool-box talks, site visits and Site Management Academy training) that help improve resource efficiency and awareness of the importance of reducing waste.</p> <p>We are updating our range of house designs and testing the use of offsite manufacturing (OSM) in their build. Expanding the use of OSM over time could lead to less energy consumed on site through the reduced need for equipment (e.g. diesel generators), and reduced transport movements to and around site as more materials are put together off site.</p> <p>We minimise the impact of rising energy and water costs for our customers by increasing the potential energy and water efficiency of new homes through efficient building fabric and services.</p> <p>We are working to minimise the risk of higher operational costs by implementing measures in both our offices and sites to reduce energy use.</p>

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									For example, in 2016 we introduced LED lighting in our Head Office (which was our most inefficient office at the time). We are also exploring the use of more efficient site cabins to reduce our electricity, diesel and water use.
Increased severity of extreme weather events such as cyclones and floods	Physical risk	<p>The frequency and intensity of severe weather events is increasing, which includes heavy rainfall, strong wind events and drought conditions. Climate scientists believe this trend will continue and could lead to a greater risk of disruption to build programmes, damaged materials or existing structures, and lost time on site (e.g. when a bricklayer cannot work due to mortar not setting or cranes unable to operate in strong winds). Any and all of these risks would increase operational costs. It would also increase the risk of health and safety accidents and other negative environmental incidents (such as inappropriate runoff into local watercourses).</p> <p>There is also the potential for disruption within our supply chain (e.g. supplier manufacturing plants located in areas subject to high physical risk from climate change), which could impact the availability, lead times and delivery of materials to our sites, and lead to significant project delays. Material costs would also likely increase.</p> <p>More frequent flooding events, extreme droughts and water scarcity also challenge us to design homes that are increasingly water-efficient and flood resistant.</p>	<p>Increased operating costs (e.g. damage to materials on site, cost increase in material supply chain)</p> <p>Health and safety of employees and others on site</p> <p>Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)</p>	Short- to medium-term	Direct	More likely than not	Medium	<p>The potential cost of lost working time and production delays vary depending on the impact and circumstances and is difficult to predict. However, if delays to the build programme were to negatively impact customer satisfaction, and potentially our ability to sell homes (as it provides an added constraint as to when the homes are available for sale), our revenue could be affected. If such delays caused a 2% reduction in revenue, this would equate to over £22m. This is a very approximate estimate.</p> <p>If there were an increase in damaged materials on site from extreme weather events, we have conservatively estimated the impact to be a 2% increase on our direct material spend to replace the materials, which equates to approximately £1.2m per year.</p>	<p>Our environmental management system is designed in accordance with the principles set out in ISO 14001. Our health and safety standard sets out procedures designed to minimise risk and is based on OHSAS 18001.</p> <p>Risk assessments are undertaken on every site and include criteria for potential hazards due to inclement weather conditions. Specific risk management measures relating to extreme temperatures and storm events are incorporated within our Health, Safety and Environmental management procedures and standards.</p> <p>The business has a Sustainable Procurement Policy in place that specifies low-carbon and locally sourced products where possible. There are also group-wide framework agreements in place for key materials to guarantee a quantity and quality of supply. Our Group Procurement Director regularly communicates with our supply chain to understand their major challenges in order to help us mitigate any potential impacts. Local suppliers are used where possible and in 2018, 26% of our procurement spend was with suppliers and sub-contractors within 20 miles of site operations.</p> <p>Through our Make Waste History campaign, our site teams are encouraged to provide adequate weather protection for our materials to avoid risk of damage.</p> <p>The business has updated its house type range and is prototyping them using offsite manufacturing (OSM) techniques. Manufacturing in a factory environment will mean that production is less susceptible to adverse weather.</p>
Changes in precipitation patterns and extreme variability in weather patterns	Physical risk	<p>Changing precipitation patterns and more frequent heavy rainfall could lead to changes to the flood risk of the land bank and to potential future land purchases.</p> <p>Increasing frequency of both periods of precipitation and drought conditions challenges us to design appropriate sustainable drainage systems and homes that reduce water demand.</p>	Increased capital costs (e.g., damage to facilities)	Medium-term	Direct	About as likely as not	Low	<p>The majority of land is secured on option. Flood risk is re-assessed at point of purchase and cost/risk factored into the land value.</p>	<p>Flood risk assessments are conducted across all developments at the pre-acquisition stage. Where flood risks are identified, appropriate flood mitigation measures are designed, such as the use of SUDs, and the costs will be factored into the land purchase price.</p> <p>With an increasing likelihood of water scarcity, particularly in south east England, it is important we consider measures to reduce water demand in our homes. All of our homes are designed to exceed the building regulations with a water consumption of 105 litres per person, per day.</p>

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Rising mean temperatures	Physical risk	<p>Increasing temperatures raise the likelihood of overheating in homes. If homes are subject to overheating, this could cause discomfort and potentially poor air quality for our customers.</p> <p>The business conducts overheating assessments across all developments and implements the necessary requirements to reduce the risk. There could be challenges to project economics and market affordability if further future-proofing of new homes against risk of overheating is required.</p>	Increased operating costs (e.g. implementing solutions to reduce overheating risk)	Medium-term	Direct	More likely than not	Medium	<p>If overheating causes new homes to be uncomfortable to live in or effect the air quality, this could have a financial impact on our operating profit and the costs of after-sales remediation. It is challenging to calculate an accurate financial value, but in 2018, approximately 350 homes were initially assessed as having a medium or high risk of overheating, before mitigation measures were implemented. If no mitigation measures were included, and issues only came to light post occupation, the mitigation cost is estimated to be around £5,000 per plot. This cost would include consultant fees to model the overheating, together with remedial solutions put in place. If the £5,000 is multiplied by 350, this equals £1,750,000.</p>	<p>Training around reducing the risk of overheating is provided to our development teams and concept design architects. Overheating can be designed out at the concept design stage for negligible extra cost. Overheating risk assessments are then conducted across all developments during the detailed design stage. Where homes are identified at the detailed design stage as having a medium or high risk of overheating, they will undergo full dynamic overheating modelling. This second analysis is not a requirement of building regulations, but it provides us with a hierarchy of solutions to mitigate the overheating risk. To further combat overheating risk across our future portfolio of homes, our new range of house designs has been modelled for the worst-case scenario of overheating, allowing us to mitigate the risk through design.</p>

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Use of more efficient production and distribution processes	Resource efficiency	The business spends approximately £6,500,000 per year on waste skips, energy and red diesel consumption. The true cost of waste will be much higher when the original cost of the materials is factored in. There is scope to reduce waste and energy and save a significant amount of money.	Reduced operating costs (e.g., through efficiency gains and cost reductions)	Medium-term	Direct	Virtually certain	Medium-low	The combined waste and energy spend is approximately £6,500,000 per year. If a 5% saving is achieved, this would equate to an annual saving of £325,000. This would be a conservative estimate as it does not take into account the savings we could make on reducing the amount of materials purchased.	<p>Increasing operational energy efficiency through our Make Waste History campaign. This has seen us launch a Pallet Return Scheme, continue to benchmark and report site performance and increase our use of renewable energy.</p> <p>The business is also implementing new house designs that will incorporate design features to reduce waste during production. Prototyping the new designs using offsite manufacturing techniques will also contribute towards less waste and diesel use on site.</p>
Use of lower-emission sources of energy	Energy source	The cost of fossil fuels is likely to increase through both diminishing natural resources and Government policy to reduce the reliance on fossil fuels. Substituting the use of fossil fuels with renewable energy will reduce the business exposure to these increases. Indeed, as the renewable energy capacity increases, and energy storage technologies improve, we could see cost savings through the use of renewable energy.	Reduced exposure to future fossil fuel price increases	Medium-term	Direct	Virtually certain	Medium-low	The increase in the cost of oil and gas is forecast to be at least 25% by 2025 (based on BEIS central estimates). This excludes increases in CCL and other potential taxes on fossil fuels. A 25% increase in our energy and diesel costs would equate to an annual cost increase of approximately £750,000. The opportunity to save this cost is based on moving away from fossil fuels and does not include the further opportunity to reduce consumption of energy and fuel.	The business is currently purchasing renewable electricity and biogas for both the Chertsey (HQ) and Bristol offices. Renewable energy is also being purchased on a selection of construction sites for our site compounds.
Development of new products or services through R&D and innovation	Products and services	<p>It is crucial that new homes built are climate resilient, comfortable to live in and have low running costs. As a result, UK Building Regulations, including Part L (conservation of energy and power) are likely to be progressively updated.</p> <p>By considering potential impacts of climate change in our home designs and evaluating the building's performance, the business can increase the skills, knowledge and expertise of employees and supply chain partners; continually improve the homes' in-use performance; and be well-placed to find cost effective methods to meet future regulatory requirements.</p>	Cost effective compliance with evolving building regulations	Medium-term	Direct	More likely than not	Medium	The business could reduce the potential design, build and time costs of meeting new building regulations. It could also help to achieve planning consents by demonstrating to local councils and communities that we are proactively considering climate change in the homes and developments we build, and efficiently meeting any planning requirements they set.	<p>We regularly communicate with stakeholders such as the Ministry of Housing, Communities and Local Government (MHCLG), Department for Business, Energy and Industrial Strategy (BEIS), Home Builders' Federation (HBF), and Homes England to understand and influence future changes in regulation. We also partner with Planning Authorities and skilled consultants to achieve consensual cost-effective outcomes.</p> <p>We have in place numerous effective technical procedures to assess the risks of climate change on the homes and developments we build, including flood risk assessment and dynamic overheating modelling.</p> <p>We are demonstrating innovation in build construction through the launch of our new range of house designs and testing the use of offsite manufacturing (OSM) techniques. Both our new house type range and the use of OSM could potentially help us to:</p> <ul style="list-style-type: none"> - reduce waste and improve the efficient use of materials - reduce energy consumed on site - reduce transport movements

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									<p>- reduce build disruptions and delays</p> <p>We are conducting Building Performance and Post Occupancy Evaluation (BPE and POE) on a selection of our new house designs that were built using OSM methods. This will gather information on building comfort and air quality within the home and the findings will be used to inform future designs.</p>
Shift in consumer preferences	Products and services	<p>With an increasing societal awareness of the importance to mitigate and manage climate change, as well as the importance of living healthy lifestyles, a shift in consumer preferences is likely. While we have yet to see a direct impact on the purchase of new-build homes today, this is definitely notable in other industries, such as Fast Moving Consumer Goods (FMCG).</p> <p>With increasing temperatures, more extreme weather events, and the general increasing awareness of individual responsibility for climate change, we expect to see the demand for homes that are designed to mitigate and adapt to climate change effectively and efficiently increase. Thermal comfort, air quality, water efficiency and health and well-being are likely to be key selling points, as energy efficiency is now.</p>	Better competitive position to reflect shifting consumer preferences, resulting in increased revenues	Medium-term	Direct	More likely than not	Medium	<p>There could be increased demand for new build homes and developments that effectively mitigate and adapt to the impacts of climate change (like overheating, water scarcity and flooding) and help customers to reduce their own carbon footprints. Providing these kinds of homes could lead to increased sales and a reputation as a housebuilder of choice for sustainable homes.</p>	<p>Existing sustainability features of the homes and developments we build are incorporated into sales information and sales pitches (e.g. energy and water efficiency, large green open spaces, walkable developments, cycle paths, electric vehicle charging points, etc.), as well as on our corporate and customer websites.</p> <p>We ensure that our homes are built to respond to the most pressing climate change impacts through effective technical procedures, such as flood risk assessment and dynamic overheating modelling. We are conducting Post Occupancy Evaluation (POE) on a selection of our new house designs that were built using OSM to ensure that the thermal comfort and air quality, along with build quality meet our customers' needs and effectively meet our design commitments to respond to climate change. The findings will be used to inform future designs and build techniques.</p> <p>Through our masterplanning, we actively seek to design our developments to encourage residents to walk and cycle to local amenities. Our Garden Village principles, which we use across a number of our larger, long-term sites, encourage healthy living and engagement with nature.</p> <p>We work to ensure that we are transparent about how we embed sustainability into our business practices and in the developments we build. Our corporate website, external communications and reporting all reference our core policies and initiatives, and we aim to clearly communicate our leadership and good practice in these areas.</p>
Reputation	Resilience	<p>Employees are increasingly looking to work for organisations that demonstrate high levels of environmental and social awareness. Therefore, by successfully managing our climate-related issues, we can enhance the</p>	Retaining and attracting talented employees	Short-term	Direct	More likely than not	Medium	<p>Improving our ability to retain talent can lead to a reduction in staff turnover. If our turnover reduced by 20%, our hiring costs could be cut by approximately £200,000 per year.</p>	<p>We work to ensure that we are transparent about how we embed sustainability into our business practices and in the developments we build. Our corporate website (including our careers page), external communications and reporting all reference our core policies and initiatives, and</p>

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		<p>business's ability to attract and retain employees.</p> <p>This is particularly the case for younger generations, as research indicates a strong preference to work where they can make a positive difference to the environment and society and where the organisation aligns to their expectations for positive corporate purpose. In fact, our internal recruitment team monitors what influences graduates' choice when selecting a company to work for. Around 64% of the applicants to our latest graduate programme stated that they want to work for a business that is environmentally aware and prioritises sustainability.</p>							<p>we aim to clearly communicate our leadership and good practice in these areas.</p>