

TRANSPORT FOR LONDON

SAFETY, HEALTH AND ENVIRONMENT ASSURANCE COMMITTEE

SUBJECT: SUSTAINABILITY AND CROSSRAIL

DATE: 9 MARCH 2011

1 PURPOSE AND DECISION REQUIRED

- 1.1 This paper describes how sustainability is being addressed by Crossrail Ltd (CRL).
- 1.2 The Committee is asked to note the paper.

2 INTRODUCTION

- 2.1 As a public infrastructure scheme, Crossrail will make a positive contribution to sustainability objectives by promoting sustainable transport choices and supporting a sustainable pattern of growth in London and the South East. The details of this formed part of the Crossrail business case and are reported in the Crossrail Environmental Statement. These describe what Crossrail will deliver in terms of sustainability.
- 2.2 This paper describes how CRL is ensuring the sustainable delivery and operation of Crossrail, in line with the Sponsors' requirements. Those requirements state that delivery shall be consistent with the Government's overall approach to the provision of major transport infrastructure, the Mayor's plans for the development of the capital's infrastructure, be integrated with the Mayor's transport and sustainability strategies, and provide value for money at every stage of the Project.
- 2.3 Having moved past the planning of Crossrail and obtaining powers under the Crossrail Act 2008, there are now three key stages remaining: Design; Construction; and Operation. Crossrail designs have reached the final stages of detailed design having variously reached points between Royal Institute of British Architects (RIBA) stages E and F and subject to a period of contractor optimisation, where the contractor will review the detailed design to improve the buildability of the works, will be finalised and construction will become the dominant activity. During construction, a key task is to ensure that the final designs and specifications are constructed, thereby delivering the sustainability elements provided for them to the eventual operator (Rail for London). Rail for London will then be responsible for maintaining and operating the Crossrail assets to deliver the operational sustainability benefits (eg energy efficiencies) that the designs permit.

3 CRL'S DEFINITION OF SUSTAINABILITY

3.1 CRL has identified seven sustainability themes reflecting the approaches of its two sponsors, Transport for London (TfL) and the Department for Transport (DfT). These themes are based on TfL's approach to sustainability, the UK Sustainability Strategy priority areas and the DfT's Delivering a Sustainable Transport System policy.

- (a) Economic progress: maximise competitiveness and productivity of economy;
- (b) Sustainable consumption and production;
- (c) Address climate change and energy;
- (d) The physical environment: natural resource protection and environmental enhancement;
- (e) Improve health, well-being and happiness;
- (f) Protect people's safety, security and health; and
- (g) Promote greater equality of opportunity and social inclusion.

3.2 The principle of good governance is applied across all seven themes and is expanded on in Section 4. The principle of using sound science is a fundamental foundation of engineering excellence and hence underpins all aspects of the design and construction of Crossrail. CRL's approach seeks to meet the expectations of our stakeholders through delivering cost effective value for money solutions at the high end of sustainability performance that deliver Crossrail on programme and within the capital spend funding envelope.

3.3 The following sections of this paper present an overview of the work and processes CRL has adopted to deliver Crossrail in a sustainable manner. Section 4 provides a brief summary of key overarching processes and approaches that have been adopted. The remaining sections provide further detail on the activities that have been and are being carried out under each of the seven Crossrail sustainability themes, with the exception of the Protect people's safety, security and health theme which is reported to the Committee separately.

4 SUSTAINABILITY MANAGEMENT

4.1 CRL recognises that every activity within Crossrail contributes to the sustainability performance of Crossrail. CRL has therefore established a Sustainability Strategy that adopts a portfolio approach to managing its sustainability performance. Sustainability is integrated into each of the Crossrail Directorates in a manner commensurate with that Directorate's function. Each of the Directorates develops action plans, objectives and targets under the Crossrail Management System and forms processes and procedures to govern and assist in achieving them.

- 4.2 CRL Directors are accountable for one or more of the seven themes and performance is monitored at the CRL Health, Safety and Environment Committee (chaired by the CEO and attended among others by the Crossrail Board Chairman and the Programme Director). In addition, there is a Sustainability Portfolio Group that comprises the key Directors with responsibilities under the themes, which meets to assess and report on progress.
- 4.3 With regard to the environmental aspects of sustainability in particular, Crossrail has an environmental management system certified to ISO14001. The Environmental Memorandum (see section 8 below) requires that through the Environmental Management System (EMS) CRL will develop, and keep under regular review, environmental objectives that address the UK sustainability agenda. In this way, the EMS is linked to and forms part of the implementation of the Crossrail Sustainability Strategy.
- 4.4 In recognition of the fact that Crossrail is moving from design into a significant new phase, construction, the organisation is currently going through a process of developing a new environmental vision for Crossrail that recognises the importance of sustainability, high level environmental performance and the legacy that the project will leave on completion.

Responsible (Sustainable) Procurement

- 4.5 CRL operates in accordance with the GLA's Responsible Procurement Policy and has published its Responsible Procurement Policy. Responsible procurement ensures that the procurement of works, services and goods takes account of and promotes best practice with regard to the environment, supplier diversity, ethical sourcing, community benefits, fair employment practices and other relevant factors.

Sustainability and Design

- 4.6 CRL has worked with the Building Research Establishment (BRE) to develop a BRE Environmental Assessment Methodology (BREEAM) for Crossrail subsurface stations. BREEAM covers energy, management, health and wellbeing, water, materials, waste, land use, air (external) and water pollution and ecology (ecological value, conservation and site enhancement). Draft appraisals by the design team BREEAM assessors indicate that at the design stage RIBA D, the designs were achieving 'very good' status. Crossrail has a target of maintaining this and a stretch target of achieving 'excellent' status. These designs are being passed to contractors that are required to set out what measures they will take to maintain and achieve additional credits before the contract is awarded.
- 4.7 CRL has also adopted the Civil Engineering Environmental Quality Assessment and Award scheme (CEEQUAL) for its civil engineering elements. CEEQUAL covers project management, land use, landscape, ecology and biodiversity, the historic environment, water resources and the water environment, energy and carbon, material use, waste management, transport, effects on neighbours, relations with the local community and other stakeholders. All the civil engineering design elements (tunnels, portals and shafts) have achieved interim awards of 'excellent'. As with BREEAM, the

designs are being passed to contractors that are required to set out what measures they will be taking to maintain these scores before the contract is awarded.

Whole Life Cost

- 4.8 Crossrail has developed a whole life cost policy statement, which is published on the Crossrail website. The policy statement recognises the Sponsors' requirement to optimise whole life cost. The statement says that in considering the balance between initial cost and whole life cost, Crossrail's primary obligation is to minimise the final cost in accordance with best value and not exceed total Sponsor funding. Within these limits, Crossrail can consider optimising whole life cost as required by the Sponsors using an appraisal period of 50 years from the Target Final Delivery Date.
- 4.9 While BREEAM and CEEQUAL are used as tools to drive sustainable design outcomes for stations and civil structures (and both also provide credits for the use of whole life costing), whole life costing itself is used in particular by Crossrail in the design and selection of systems and rolling stock.

5 ECONOMIC PROGRESS

- 5.1 Overall achievement against this theme lies more with what Crossrail will deliver. However, there are elements that correspond with the *how*. For example, Crossrail is a publicly funded project and ensuring value for money is a key area of management and target setting within Crossrail. Various Value Management opportunities have been identified and implemented on the project with savings to date of approximately £1bn.
- 5.2 In order to maximise the potential regeneration benefits of Crossrail and as part of achieving improved health, well-being, happiness and security, a large amount of work has been focussed into master-planning the urban realm (transport interchange and urban realm design) around Crossrail stations. This work recognises that the Crossrail 'experience' will go beyond a reliable and punctual train journey and high quality station design, and that future Crossrail passengers will also judge the success of the railway by their experience of using the spaces outside the stations as they arrive and leave. Crossrail, together with its key stakeholders, therefore intends to set high standards for the immediate surroundings of the stations in terms of the design and functionality of the transport interchange and the urban realm. A key step to achieving this aim was the signing of a memorandum of understanding (MOU) late last year between Crossrail, TfL, Local Authorities and other key stakeholders.
- 5.3 The planning of interchanges associated with Crossrail stations is being guided by TfL's Interchange Best Practice Guide, appropriate government guidance and legislation, and the Local Authorities' development plans. The Best Practice Guide establishes a Design and Evaluation Framework with the following principles:
- (a) Efficiency: operations; movement to, and within, the interchange; sustainability;

- (b) Usability: accessibility; safety and accident prevention; personal security; protection;
- (c) Understanding: legibility; permeability; wayfinding; information; and
- (d) Quality: perception; built design; spaces; sense of place.

5.4 As established in the MOU, using best practice, the design of the urban realm adjacent to Crossrail stations will aim at high quality based on the following principles:

- (a) Safe and secure, in terms of crime, fear of crime, terrorism and casualty reduction;
- (b) Accessible, with step-free access on key pedestrian desire lines;
- (c) Attractive, in line with the aspirations of the Local Authorities, Crossrail and stakeholders;
- (d) Legible, such that wayfinding is provided, as far as possible, without the use of signage (eg through the use of landmarks and sight-lines)¹;
- (e) Adaptable and sustainable, so that the possibility of a different use of the space is not precluded in the designs;
- (f) Well-connected, minimising barriers of all kinds;
- (g) Characteristic and diverse, reflecting local needs and context and – where relevant – local design standards; and
- (h) Stimulate/enable regeneration opportunities.

5.5 As with the Transport Interchanges, the designs will be subject to the Local Authorities' development plans and government guidance and legislation.

6 SUSTAINABLE CONSUMPTION AND PRODUCTION

Responsible Procurement and Contractors

- 6.1 All contractors are required to include an assessment of environment and sustainability and demonstration of environmental track record as a key criterion in the selection of subcontractors and suppliers. Contractors are also required to sign up to and meet the requirements of the Mayor's Green Procurement Code and ensure that sustainability is incorporated into all procurement activities.
- 6.2 The procurement of all timber must be certified by the Forest Stewardship Council (FSC) or equivalent and contractors must have processes for checking and maintain records to demonstrate that all timber delivered to site is FSC-certified.

¹ Where signage is necessary, a strategic approach is being adopted. Within London, this is the Legible London system.

Materials Selection

- 6.3 Crossrail has set a target that at least 15 per cent of total material value derives from reused and recycled content in new construction (with an aim for 20 per cent). This is consistent with TfL's recommended procurement clause for relevant contracts. The aim is to divert materials from landfill with the additional benefit of reducing the amount of virgin materials used, thereby limiting the depletion of finite resource and the impacts associated with extracting and processing these resources.
- 6.4 Crossrail has worked closely with WRAP (Waste and Resources Action Programme) on this issue. An important point is that inclusion of recycled content does not mean changing specification. A material with recycled content should perform in exactly the same manner as 100 per cent virgin material. The target is based on what is known to be achievable based on contractor performance but set at the higher end of that performance range, in line with Crossrail's aspiration to raise the bar on areas of environmental performance while still being realistic about what can be achieved.
- 6.5 The Crossrail project consists largely of massive quantities of concrete and steel. The steel industry is dependent on global procurement and as such it is difficult to influence or establish the overall environmental impact of reinforcement, although there are schemes that are attempting to do this. For concrete, there is the potential for use of cement substitutes; these are typically Ground Granulated Blast-furnace Slag (GGBS) and Pulverised Fuel Ash (PFA). These are both waste products and contribute to the reused and recycled content of the concrete. During the design phase, Crossrail has developed specifications to allow the opportunity to maximise the additions of GGBS and PFA during the construction of Crossrail. Contractors are then required to deliver against these specifications.
- 6.6 During the design phase, work was also undertaken on specifications for other materials. For example, the common architectural components contract has provided an excellent vehicle for not only designing to provide components that give Crossrail a common identity across its stations but has also provided for the opportunity to evaluate other issues. The reused and recycled content of the materials has been considered alongside other factors such as low environmental impact, ethical sourcing and low embodied energy. The specifications from the common architectural components contract have been used as the basis for discussion with station architects to ensure that the choices that they are making take these factors into consideration. Again, these specifications are then passed on to contractors.
- 6.7 During construction, the WRAP Net Waste tool (see also 7.13) is the primary tool to track contractor performance. Contractors are required to populate the tool at the start of the process so they can make material choices that substitute reused/recycled content alternatives to virgin materials. Crossrail will work with contractors ensuring they identify opportunities to procure materials incorporating reused or recycled content where practical and cost effective. Contractors are required to produce four-weekly updates on progress in line with their normal reporting cycle and we will use this information to report on performance.

Waste

- 6.8 Crossrail will generate waste and excavated material. The vast majority of this comprises clean excavated material from the tunnels with the remainder arising from demolition and construction activities. In accordance with the Environmental Minimum Requirements (EMR), Crossrail is committed to implementing the waste hierarchy to reduce, reuse and recycle waste. Crossrail has adopted an objective to remove, where reasonably practicable, excavated material by rail and water transport and import construction materials by rail. In this regard, current projections show that on a tonne by kilometre basis, 85 per cent of excavated material will be transported by rail and river. Crossrail has:
- (a) Signed up to the “Halving Waste to Landfill” campaign promoted through WRAP. This is a commitment to halving the amount of construction, demolition and excavation waste going to landfill by 2012. It is one of the construction commitments set out by the Strategic Forum for Construction, which sees responsible waste management as a key component of sustainability and is in line with England’s Strategy for Sustainable Construction.
 - (b) Set best practice but achievable targets for waste recovery:
 - (i) Recover at least 95 per cent of clean excavated materials and aim to achieve a stretch target of 100 per cent;
 - (ii) Recover at least 90 per cent of demolition waste and aim to achieve a stretch target of 95 per cent; and
 - (iii) Recover at least 90 per cent of construction waste and aim to achieve a stretch target of 95 per cent.
- 6.9 Crossrail has developed a bespoke online reporting tool for waste (SmartWaste) which allows us to monitor performance against the targets. Designers are using WRAP’s Net Waste tool to reduce waste in the design process and are preparing Site Waste Management Plans as part of the design to demonstrate the ways in which waste has been reduced.

7 CLIMATE CHANGE AND ENERGY

Climate Change Adaptation

- 7.1 The key climate change risks to Crossrail are increased risk of flooding, higher ambient and extreme temperatures and increase in extreme weather events (extremes of wind, snow, cold).
- 7.2 Crossrail has adopted a number of strategies to mitigate these risks including:
- (a) In association with the Environment Agency, undertaking flood risk modelling to 2100 to establish flood design levels for stations, portals and shafts. Mitigation methods focus on passive protection measures such as raising entry or egress levels, raising track or cill levels, or extending portal walls. However, where there is still some residual flood

risk that passive designs cannot mitigate, then appropriate active flood protection measures and procedures have been identified, such as flood gates and stop logs.

- (b) All rolling stock will be air conditioned, which will protect passengers against higher ambient temperatures and extreme hot weather events.
- (c) The rolling stock systems equipment will be designed to operate in high temperature environments such as those experienced in southern Europe to prevent potential failure during extreme hot weather events. All of our prospective rolling stock suppliers are used to supplying trains for environments with higher ambient temperatures than the historic UK levels. This is also reflected in the international standards to which key aspects of the trains will be required to be compliant. The important elements of glazing and livery will be specified to mitigate any potential problems with solar gain.
- (d) The subsurface stations are equipped with full height platform edge doors separating the tunnel environment from the station platform areas. This has enabled the station platform areas to be mechanically cooled thereby protecting the health and safety of the travelling public and staff.
- (e) Specification of continually welded, de-stressed railtrack to prevent buckling in high temperatures.

7.3 Crossrail reviewed its risk assessment in late 2010 as part of the wider TfL exercise in preparing its Adaptation Reporting Power submission in relation to Government requirements.

Carbon Footprint

7.4 Crossrail has just completed its second update of its carbon footprint model. The revised footprint covers the central section stations, shafts, portals, internal finishing, tunnelling, demolition and central and surface rolling stock emissions. The designs of the surface works have not advanced to the same level as the central section and a further carbon footprint update will be developed once they are. In addition, certain outstanding details for the energy consumption of two of the central section stations were not available to inform this current update and will also be included at that time. The updated footprint covers both construction and operational emissions.

7.5 Based on the current RIBA E designs, Crossrail is expected to emit between 9.6 million tonnes and 14.9 million tonnes of CO₂ during its lifetime (construction and 120 years of operation)¹. Most of these emissions (85 per cent) will be from operation, as opposed to construction. Total construction emissions are calculated to be approximately 1.5 million tonnes. This is a slight reduction in the total construction emissions estimated in 2008 (1.7 million tonnes) and is predominantly due to the omission of the surface works. The embodied carbon in materials will be the largest source of construction CO₂ emissions (58 per cent of total construction emissions), followed by

¹ Range depends upon assumptions on rolling stock and of future grid mix projections for the Crossrail 120 year design life.

construction site activity (29 per cent of total construction emissions). Tunnel boring machinery (nine per cent) and waste removal and delivery (five per cent) are smaller sources¹.

- 7.6 The majority of operational CO₂ will be from rolling stock operation (89 per cent), while 11 per cent of emissions are attributable to stations. In terms of energy consumption, this varies from station to station and, in particular, is different for the sub-surface stations as compared to the only central section surface station, Custom House. The total annual energy consumption of the central section stations for which data were available is 28 GWh/yr. The energy consumption from the rolling stock depends on a number of variables but is likely to be in the region of 240 GWh/yr.
- 7.7 Crossrail will play a role in reducing emissions from existing road and rail transport. Based on this, the CO₂ emissions payback period for Crossrail will vary between five and 32 years. The wide range in the payback period arises from uncertainties in input emissions factors e.g. for displaced diesel rail services, UK grid mix projections and from the fact that the energy efficiency of the rolling stock (eg benefits of a lightweight versus a heavier train) and the opportunity for optimised 'eco-driving' techniques will not be finalised until the trains and signalling systems have been procured and the passenger service timetable finalised. If the least likely worst and best case scenarios are excluded, a more realistic payback period of nine to 13 years is expected.

Construction

- 7.8 CRL has integrated energy reduction requirements into works contracts. Contractors are required to:
- (a) Develop and implement energy management plans for their activities;
 - (b) Establish energy consumption targets;
 - (c) Investigate options for procuring energy from renewable sources;
 - (d) Purchase energy efficient equipment (using commercial road vehicles that meet Euro 3 standards); and
 - (e) Install electricity metering and, where there are uses on site that consume large amounts of electricity, sub-metering.

Operations

- 7.9 Crossrail has set both weight and energy efficiency targets for the rolling stock of 350 tonnes unladen weight per 10 car train and 24 kWh/ train. This last figure equates to 55g CO₂ per passenger kilometre, based on current projections of passenger demand and train service patterns. These weight and energy consumption targets for rolling stock will make Crossrail trains state-of-the-art on energy efficiency.

¹ Total exceeds 100 per cent due to rounding.

- 7.10 Crossrail trains will contain driving advice systems for drivers to deliver efficient manual driving on surface routes. Below ground, the automatic train operation algorithms will ensure energy efficient driving in the central tunnel section and regenerative braking will be a design requirement on all Crossrail rolling stock.
- 7.11 As noted in 4.6 above, Crossrail has worked with the BRE to develop what is known as the Tailored Bespoke BREEAM for Crossrail subsurface stations and has set an aim for all its central section stations to achieve a BREEAM rating of 'Very Good' and has set a stretch target of 'Excellent'. While this does not in itself specify a certain level of energy efficiency or carbon emissions, performance above the norm will be required. Examples of what this has achieved in the current designs are:
- (a) The development of 'plug and play' light units so that they can incorporate efficient current fluorescent luminaires and accommodate new light emitting diode (LED) luminaires as the technology becomes available. LED has also been costed for use in the tunnels.
 - (b) Building Management Systems with Digital Addressable Lighting Interface (DALI) to optimise the functionality of the electrical and mechanical systems with automatic reduced lighting levels during engineering shifts and reduced escalator usage during off-peak periods.
- 7.12 Ground source heat pump technology is to be incorporated into the Crossrail station infrastructure providing heating and cooling to the oversite development that will eventually be built back on top of the Crossrail ticket halls and structures.
- 7.13 In terms of embodied energy, during construction, the WRAP Net Waste tool (see paragraph 6.7) will be used to track contractor performance as regards materials selection. Net Waste contains an embodied energy calculator and so Crossrail will be able to track progress on the reduction of embodied energy.

8 THE PHYSICAL ENVIRONMENT

- 8.1 Crossrail essentially defines this theme as addressing the environmental impacts during construction. Typically, this encompasses what might be loosely considered as 'classic' environmental management covering such diverse elements as the management of noise and vibration, impacts on ecology and archaeology, heritage, air quality etc.
- 8.2 When the Crossrail Hybrid Bill was submitted to Parliament to obtain appropriate powers for the construction of Crossrail, an Environmental Impact Assessment (EIA) was undertaken and an Environmental Statement (ES) produced. The ES describes the findings of the assessment of the likely significant environmental impacts (both negative and positive) for both construction and operation, and establishes an environmental baseline for the project. The ES identified that the vast majority of significant environmental impacts of Crossrail would occur during its construction.

- 8.3 Generally, there are three distinct components that taken together effectively control the environmental impacts of the construction and operation of Crossrail. They are:
- (a) Arrangements within the Crossrail Act 2008;
 - (b) Policies and commitments entered into outside of the Act; and
 - (c) Existing legislation, unless expressly or impliedly dis-applied or modified by the Crossrail Act.
- 8.4 In relation to point (b), there are a variety of control mechanisms and mitigation strategies that fall outside of the Crossrail Act of which the key one is the Environmental Minimum Requirements (EMR) for Crossrail. The EMR is a suite of documents that has been developed in consultation with local authorities and other relevant stakeholders. CRL is contractually bound to comply with the controls set out in the EMR through the Project Development Agreement (PDA).
- 8.5 In addition to what is known as the General Principles, the EMR comprise the undertakings and assurances given to Parliament and petitioners by the Secretary of State during the passage of the Crossrail Bill (captured in the Crossrail Register of Undertakings and Assurances), and three documents, namely the Planning and Heritage Memorandum, Construction Code and Environmental Memorandum.
- 8.6 The Construction Code is the key document for managing and reducing Crossrail's construction impacts. It was developed taking into account all the construction codes of the local authorities through whose areas Crossrail will pass and several major infrastructure projects including Thameslink, Channel Tunnel Rail Link and Terminal 5. As such, it is a document comprising the best practice from all of these sources. The Construction Code has been written into all the construction contracts.

9 EQUALITY OF OPPORTUNITY AND SOCIAL INCLUSION

Skills and Employment

- 9.1 Crossrail has developed a Skills and Employment Strategy that is available on its website. The strategy sets out Crossrail's skills needs and the current work on skills from across the project under four themes, maintaining safety, inspiring future talent, supporting local labour and revitalising Crossrail's tunnelling skills base. Workstreams include:
- (a) Lorry driver training for frequent Crossrail drivers;
 - (b) Continuing and developing the Young Crossrail education programme – established in 2003 with a re-launch of web resources in 2010;
 - (c) Providing 400 apprenticeships through the supply chain – Strategic Labour Need Training requirements are being included in all contracts;

- (d) Facilitating job brokerage with JobCentre Plus (JCP) – a Memorandum of Understanding has been signed and JCP is now established in Crossrail’s Visitor Information Centres; and
- (e) Establishing a Tunnelling and Underground Construction Academy for the industry – construction of the facility has just begun and a curriculum developed for NVQ level 2 in Tunnelling Skills with the sector skills councils for Construction (Construction Skills).

Inclusivity

- 9.2 Crossrail first published its Inclusivity Policy in 2005. The policy addresses the need for inclusion in the planning, design, construction and operation of Crossrail and was developed in the context of a complex legislative framework that places obligations on the company. The policy will enable Crossrail to fulfil its obligations as well as go beyond the legal requirements in implementing good practice.

Inclusive Design

- 9.3 Inclusive design affects all aspects of a railway service. Existing railway design often excludes certain groups from using them due to, for example, physical barriers (eg steps) or operational issues that make the service difficult or impossible for some people to use.
- 9.4 Some other issues that need to be considered are public perception of stations and trains, particularly in terms of safety or personal security, staff conduct and attitude, or the built environment around the stations.

Accessible Stations

- 9.5 Crossrail will improve accessibility to key locations on the route. All newly built Crossrail stations are being designed in accordance with the DfT guidance set out in Accessible Train Station Design for Disabled People: A Code of Practice and will provide step-free access, simple signage and information, public address and electronic customer information systems, contrasting finishes, seating and wide aisle gates in the gateline to ensure that the majority of passengers can move independently through stations to access the Crossrail service.
- 9.6 Including the existing stations that Crossrail serves, there will be step-free access from street level to Crossrail platforms in both directions at 29 out of 37 of its stations. All central section stations will have step-free access to trains.

Accessible Trains

- 9.7 Crossrail trains will comply fully with the Persons with Restricted Mobility (PRM) Technical Specification for Interoperability (the harmonised pan-European mandatory standard that is the internationalised successor to the Rail Vehicle Accessibility Regulations for main-line trains) and among other things will have dedicated space for wheelchairs. Each carriage will provide both visual and audio information about the train's journey and a facility to

alert and speak to the driver in the event of an emergency. Drivers will also be able to view CCTV images of all carriage interiors.

10 SUMMARY OF ACHIEVEMENTS

10.1 Crossrail has gone through an extensive period of planning and design and is now starting to enter the construction phase in earnest. Just before Christmas 2010, the first big tunnelling contracts were awarded. Tunnelling itself will not begin until early 2012. This year, invitations to tender will be progressively issued and awarded for the major station packages.

10.2 The achievements to date therefore reflect the stage that Crossrail is at in its lifecycle. Chief among them is the production and implementation of a comprehensive Sustainability Strategy that recognises that sustainability is about economic, social and environmental issues delivered together. A governance framework has been established under the Strategy that recognises that the successful delivery of the Strategy requires work in all areas of the organisation with Directors responsible for those work areas. A list of some of CRL's sustainability achievements is provided below:

- (a) Responsible Procurement, Inclusivity, Environmental policies published and implemented;
- (b) The signing of a Memorandum of Understanding with all the Crossrail local authorities, TfL and other key stakeholders for the delivery of the urban realm and the development of masterplans;
- (c) Developing the first BREEAM for subsurface stations with indicative scores of 'very good' achieved;
- (d) ISO14001 accreditation;
- (e) CEEQUAL Interim Awards of 'excellent';
- (f) Comprehensive waste and rolling stock energy efficiency targets established;
- (g) Development and delivery of a bespoke safety and fuel efficient driving training course for all lorry drivers making frequent trips to Crossrail sites;
- (h) Main haulage contractors required to join TfL's Freight Operators Recognition Scheme (FORS); and
- (i) Construction has begun on the Tunnelling and Underground Construction Academy.

11 NEXT STEPS

11.1 The main challenge for Crossrail is to deliver the potential sustainability benefits developed in the planning and design phases, to work with our contractors to ensure that they meet the standards and targets set, deliver to the material and design specifications and maintain and possibly exceed the

awards already achieved. This is not going to be a small task but is one that the organisation of the project is being established to meet.

- 11.2 Crossrail is also looking further at how it will report its performance to a wider audience than its sponsors and will look at various media, principally its website to achieve that.

12 RECOMMENDATION

- 12.1 The Committee is asked NOTE the paper.

13 CONTACT

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