

# SILVERTOWN TUNNEL

## Volume 3: Project Agreement – Schedules 2 to 31

### Schedule 8 – Management Systems

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**SCHEDULE 8****MANAGEMENT SYSTEMS****Part 1 - The Project Co Management System****1. General requirements of the Project Co Management System**

- 1.1 Project Co shall develop a management system in accordance with the Project Co Mobilisation Plan to cover all aspects of the Project (the "**Project Co Management System**") and shall submit the Project Co Management System to TfL for review under the Review Procedure.
- 1.2 Project Co shall comply with the Project Co Management System (including as amended in accordance with paragraph 1.9) which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure and perform its obligations under this Agreement in accordance with the Project Co Management System.
- 1.3 In the event Project Co considers that specific documentation is not required at the time of submission of the Project Co Management System pursuant to paragraph 1.1, Project Co may request such documentation be excluded and TfL may agree to such documentation being submitted at a specified date following the submission of the Project Co Management System.
- 1.4 Project Co shall not commence or permit the commencement of any aspect of the construction of the Works before the Project Co Management System has been endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure.
- 1.5 Project Co shall ensure that the Project Co Management System:
- 1.5.1 includes all of the matters and comply with all of the requirements set out in this Schedule 8 (*Management Systems*);
  - 1.5.2 is based on the draft documentation set out in Annex 1 (*Project Co's Draft Management System*);
  - 1.5.3 is developed in accordance with the relevant ISO series; and
  - 1.5.4 complies with Good Industry Practice.
- 1.6 Project Co shall ensure the Project Co Management System provides a system of self-certification which is capable of demonstrating that all Project Co's obligations under this Agreement have been satisfied.
- 1.7 Project Co shall ensure that the Project Co Management System includes integrated systems for quality management, environmental management, health and safety management and information management which comply with the relevant parts of this Schedule 8 (*Management Systems*).
- 1.8 The requirements in this Part 1 (*The Project Co Management System*) are without prejudice to any other requirements of this Agreement, including the requirements relating to:
- 1.8.1 Quality Management Systems contained in Part 2 (*Quality Management Systems*);

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Part 1 – The Project Co Management System

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- 1.8.2 Health and Safety Management System contained in Part 3 (*Health and Safety Management System*);
- 1.8.3 Environmental Management System contained in Part 4 (*Environmental Management System*); and
- 1.8.4 Information Management System contained in Part 5 (*Information Management*).
- 1.9 Project Co shall review and, where appropriate, propose amendments to the Project Co Management System throughout the duration of the Agreement Period.
- 1.10 Project Co shall ensure any proposed amendments to the Project Co Management System:
  - 1.10.1 shall be submitted to TfL for review under the Review Procedure; and
  - 1.10.2 may only be implemented once the same have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.
- 1.11 In complying with its obligations in relation to management systems pursuant to the Transferred DCO Functions:
  - 1.11.1 Project Co shall take into account and comply with the obligations of this Schedule 8 (*Management Systems*); and
  - 1.11.2 where the transferred DCO Functions and this Schedule 8 (*Management Systems*) require a plan or other document of the same name or of substantially the same content, (subject to paragraph 1.11.1) only one plan or document is required to be developed by Project Co to discharge the relevant obligation in this Schedule 8 (*Management Systems*) and the relevant Transferred DCO Function.

**2. Management by Project Co**

- 2.1 Project Co, through application of the Project Co Management System, shall be responsible for the implementation and performance of all other Management Systems.
- 2.2 Project Co shall, and shall ensure that any Sub-Contractors and suppliers shall, allocate suitable resources and appropriate authority to implement and maintain Management Systems to provide assurance that the Project is being conducted in accordance with this Agreement.
- 2.3 Project Co shall ensure that any Management System put in place by a Sub-Contractor shall include integrated or separate systems for quality management, environmental management, health and safety management and information management, and each system shall comply with the Project Co Management System and the requirements of this Schedule 8 (*Management Systems*).

**3. General Requirements of Management Systems**

- 3.1 Project Co acknowledges that any supplementary information (including, without limitation, quality manuals, plans, procedures or similar documents) referred to in any Management System shall form part of that Management System and Project Co shall

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## Schedule 8 – Management Systems

Part 1 – The Project Co Management System

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submit such supplementary information for consideration at the time of submission of that Management System or amendments to that Management System, in accordance with the Review Procedure.

3.2 Without prejudice to any other term of this Agreement, Project Co shall ensure that the Project Co Management System and all Management Systems shall include, in relation to and where applicable for that Management System:

- 3.2.1 details of the quality and other relevant objectives for the Project;
- 3.2.2 details of Project Co's organisational structure, contractual arrangements and lines of communication to cover all activities to be performed in respect of this Agreement;
- 3.2.3 details of all joint ventures, Sub-Contractors and suppliers and related Management Systems, including the relationship between each of the same;
- 3.2.4 details of the scope of services, responsibilities and authorities of Project Co and any Sub-Contractors or suppliers in relation to this Agreement;
- 3.2.5 names, titles and job descriptions for key staff describing responsibilities, authorities and the specific competency, skills and experience required for those positions (a copy of the CV for each individual shall be separately submitted to TfL on that individual's appointment) in addition to a competency organisation chart which shall be maintained by Project Co for the duration of the Project;
- 3.2.6 arrangements for the procurement of services, materials and products and control of Sub-Contractors, including the requirements for the preparation and submission of Management Systems and records;
- 3.2.7 arrangements for managing all interfaces including between the Management Systems of Project Co and Project Co Related Parties pursuant to this Agreement;
- 3.2.8 programme for the Project and arrangements for monitoring and reporting progress of all activities;
- 3.2.9 a schedule of document deliverables to be provided to TfL for each phase of the Project and target dates for delivery of the same, incorporating the requirements of Schedule 9 (*Certification and Review Procedures*) where applicable;
- 3.2.10 a schedule of the proposed quality records and proposed retention periods in respect of the same;
- 3.2.11 arrangements for reporting on all Management Systems in accordance with Part 2 (*Reports*) of Schedule 16 (*Records and Reporting*);
- 3.2.12 the liaison, document control and reporting arrangements with TfL, TfL Related Parties and any Relevant Authorities, including arrangements to allow TfL to designate specific or random witness points;
- 3.2.13 arrangements for liaising with third parties, the public, press, media and similar parties in relation to the Project in accordance with the requirements of Schedule 6 (*Interested Parties, Third Party and Liaison Procedures*);

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Part 1 – The Project Co Management System

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- 3.2.14 arrangements for dealing with comments and complaints received by Project Co or its Sub-Contractors from Users or others in relation to the Project;
- 3.2.15 details of performance against Key Performance Indicators and other performance measures in relation to the Project, including in accordance with Schedule 15 (*Design & Construction Performance Monitoring*) and Schedule 20 (*Payment Mechanism*);
- 3.2.16 arrangements for contract and other performance reviews should any Sub-Contractor or supplier failure to meet performance levels;
- 3.2.17 a manual which describes the Management System, including policy, objectives and targets, and describes the scope and the processes (to include, as a minimum, process scope, process owners, process objectives, performance measures associated with each process, access arrangements and means of imposition on the supply chain) and main elements of the Management System and their interaction;
- 3.2.18 documented procedures and information required by BS EN ISO 9001: 2015, BS EN ISO 14001:2015 and BS EN ISO 45001:2018 or equivalent documented procedures needed by Project Co to ensure the effective planning, operation and control of its processes and activities for all aspects of the Project (where TfL agrees that any procedure is not pertinent at the time of any submission to the Review Procedure, a short synopsis of each such procedure);
- 3.2.19 details of any other written procedures, method statements, inspection and test plans, manuals, work instructions, permit arrangements and any other such documentation to be applied to ensure the effective management by Project Co of all activities to be undertaken as part of the Project, including by Sub-Contractors;
- 3.2.20 control arrangements including Hold Points, Witness Points, testing arrangements and lists of any relevant inspection and test plans of Project Co and any Sub-Contractors or suppliers;
- 3.2.21 details, including plans or programmes produced as a result of Management System planning, of how the activities of Project Co and each of its Sub-Contractors in respect of the Project will be performed in respect of the Project;
- 3.2.22 details of the Quality and Assurance Director (as defined in paragraph 4.1) including name and job specification;
- 3.2.23 details of the method for controlling changes and modifications to the Project Co Management System (including the requirement to submit such changes or modifications to TfL in accordance with the Review Procedure);
- 3.2.24 details of any other measures necessary to meet the objectives of the Project Co Management System and those imposed by Project Co on any Sub-Contractors;
- 3.2.25 any other information to demonstrate how Project Co will meet its obligations under this Schedule 8 (*Management Systems*) and all its obligations under this Agreement;

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Part 1 – The Project Co Management System

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- 3.2.26 arrangements for recording and reporting to TfL the occurrence of any matter which constitutes or may constitute a breach by Project Co under this Agreement; and
- 3.2.27 arrangements for Project Co keeping itself informed of any changes to relevant requirements from this Schedule 8 (*Management Systems*), Technical Requirements, Applicable Requirements or other obligations under this Agreement, the management and implementation of any changes.

**4. Project Co Quality and Assurance Director**

- 4.1 Project Co shall, for the duration of the Project, employ a quality and assurance director (the "**Quality and Assurance Director**"), who shall be independent of the carrying out of the Works and Services and have the requisite experience required by this Agreement.
- 4.2 Project Co shall ensure that the Quality and Assurance Director has specific responsibility and authority for ensuring the establishment and maintenance of all Management Systems and accountability for the performance of Management Systems.
- 4.3 Project Co shall ensure that the Quality and Assurance Director is sufficiently competent to fulfil his role, including but not limited to:
  - 4.3.1 possessing appropriate knowledge and practical experience of developing, implementing, assuring and improving management systems as relevant to the Project;
  - 4.3.2 being a member of the Chartered Quality Institute;
  - 4.3.3 having appropriate technical qualifications and experience in order to assess the implications of findings from audits, surveillance and inspections; and
  - 4.3.4 being a competent auditor or will use and/or employ competent auditors to ensure risks are being managed.
- 4.4 The identity of the Quality and Assurance Director (and any replacement), the job specification and responsibilities shall be subject to the prior approval of TfL (such approval not to be unreasonably withheld or delayed).
- 4.5 The Parties acknowledge and agree that, without limitation to the foregoing, the job specification and responsibilities of the Quality and Assurance Director shall include:
  - 4.5.1 ensuring the production, implementation and effective operation of the Project Co Management System;
  - 4.5.2 reviewing all Management Systems monthly to ensure their continued suitability and effectiveness;
  - 4.5.3 auditing, or ensuring audit of, the Project Co Management System and all other Management Systems as required by relevant accreditation or otherwise at quarterly intervals and reporting the findings of such audits to TfL;
  - 4.5.4 producing management information and reports for and attending senior management review meetings to ensure that the Project Co Management System remains suitable, adequate and effective;

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Part 1 – The Project Co Management System

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- 4.5.5 developing, providing and ensuring completion of induction and training in the use of Management Systems by all Project Co Related Parties undertaking any activity on Project Land in relation to the Works and Services;
- 4.5.6 developing, providing and ensuring completion of appropriate training for those with specific responsibilities in relation to Management Systems, including Sub-Contractors;
- 4.5.7 ensuring the provision and review of inspection and test plans and approving the quality elements of method statements;
- 4.5.8 ensuring compliance with Applicable Requirements and all requirements of this Agreement;
- 4.5.9 liaising with TfL on all matters relating to the Management Systems; and
- 4.5.10 ensuring that relevant records are maintained and reported in accordance with the requirements in Schedule 16 (*Records and Reporting*).

**5. Management System Monitoring**

- 5.1 TfL shall be entitled to carry out audits of all Management Systems at quarterly intervals and may carry out other periodic monitoring, spot checks and auditing of such Management Systems at any time.
- 5.2 Project Co shall include with all Management Systems an audit schedule of internal Sub-Contractors and supplier audits that are to be conducted by Project Co personnel or an approved external auditing resource.
- 5.3 Project Co shall ensure that the audit schedule referred to in paragraph 5.2:
  - 5.3.1 uses a risk based approach and ensures that all key activities are audited at a time and frequency appropriate to the activity under review; and
  - 5.3.2 shall be supplemented by Project Co's surveillance activities which verify compliance with this Agreement.
- 5.4 Project Co shall allow TfL and third parties authorised by TfL to:
  - 5.4.1 observe all inspections and audits, including those carried out by or on behalf of Sub-Contractors and suppliers; and
  - 5.4.2 conduct additional independent audits as TfL considers appropriate to provide assurance that the Project is being conducted in accordance with this Agreement.
- 5.5 Project Co shall ensure that all audits referred to in this paragraph 5 (*Management System Monitoring*) shall be carried out in accordance with the guidelines of BS EN ISO19011:2011 and all reports are, unless otherwise agreed by TfL, to be submitted to TfL within ten (10) Working Days of completion of the relevant audit.
- 5.6 Project Co shall record, track and manage the timely closeout of any issues as agreed with TfL which have been identified in any audit of a Management System by implementing the necessary corrective action to eliminate the detected issue and its cause.

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Part 1 – The Project Co Management System

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- 5.7 Project Co shall analyse and communicate all audit findings to TfL, take appropriate management actions and implement system and process improvements, where appropriate.
- 5.8 Project Co shall agree with TfL (and thereafter implement) an escalation process to TfL, which shall be designed and implemented to ensure the timely application of corrective and preventative action, where non-compliance has not been effectively and efficiently resolved in accordance with timescales agreed with TfL.
- 5.9 Project Co shall notify TfL of all corrective and preventative actions taken pursuant to paragraph 5.8.
- 5.10 Project Co shall ensure that each Sub-Contractor shall comply with the requirements of this paragraph 5 (*Management System Monitoring*).
- 5.11 Project Co shall promptly provide to TfL such information as TfL may reasonably require to demonstrate compliance with the requirements set out in this Schedule 8 (*Requirements for Management Systems*).

**Annex 1 of Part 1 – Project Co's Draft Management System<sup>1</sup>**

**Commercially sensitive Information**

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<sup>1</sup> Note to Tenderers: the Preferred Bidder's response to Part 4 (*Instructions and Guidance to Tenderers*) of the IGT will be included in this annex.

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## **SCHEDULE 8**

### **MANAGEMENT SYSTEMS**

#### **Part 2 – Quality Management Systems**

##### **1. General Requirements of Quality Management Systems**

- 1.1 Project Co shall develop quality management systems for the design, construction and operation and maintenance of the Project (the "**Quality Management Systems**").
- 1.2 Project Co shall ensure that each Quality Management System shall:
- 1.2.1 be developed in accordance with the relevant ISO 9000 and ISO 10000 series;
  - 1.2.2 be ISO 9000:2015 certified by a UKAS or equivalent ISO accredited certification body within one (1) year of the Effective Date;
  - 1.2.3 comply with Good Industry Practice; and
  - 1.2.4 include, in relation to and where appropriate for that Quality Management System:
    - a. a quality manual describing how the Quality Management System meets the requirements of BS EN ISO 9001:2015;
    - b. a quality plan or plans in accordance with ISO 10005:2005 in addition to a complete list of such plans;
    - c. details of quality control arrangements for effective management by Project Co of the work of Sub-Contractors at any location, including a list of inspection and test plans or like items for records of compliance;
    - d. arrangements for handling, storage, package, preservation and delivery of materials, documents, drawings and data to be used in respect of the Project; and
    - e. measures for predicting, identifying, rectifying, analysing and reporting of preventative and corrective action in relation to Works or Services that do not comply with that Quality Management System.

##### **2. Quality Management System for Design**

- 2.1 Project Co shall ensure that the Designer prepares and submits to Project Co, who shall then submit to TfL for review under the Review Procedure, a Quality Management System relating to the design of the Works (the "**Design QMS**") which shall:
- 2.1.1 be based on the draft set out in Annex 1 (*Draft Quality Management System for the Design*);
  - 2.1.2 be developed in accordance with the Project Co Mobilisation Plan;
  - 2.1.3 be developed in accordance with the guidance in DMRB document GD02 Quality Management Systems for Highways Design; and

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Part 2 – Quality Management Systems

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- 2.1.4 include all of the matters and comply with all of the requirements set out in paragraph 1 (*General Requirements of Quality Management Systems*) and this paragraph 2 (*Quality Management System for Design*).
- 2.2 Project Co shall comply with the Design QMS (including as such may be amended in accordance with paragraph 2.4) which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure and shall ensure all Sub-Contractors involved in the design of the Works shall comply with the same.
- 2.3 Project Co shall ensure the Design QMS shall include:
- 2.3.1 details of the Client, Principal Designer and Principal Contractor (as defined in the CDM Regulations), Checking Team, Checker and Audit Team;
- 2.3.2 arrangements for including an O&M Contractor in the design process during the Works;
- 2.3.3 details of any reference documents, standards, performance or and other design input criteria; and
- 2.3.4 procedures for management of:
- a. design changes during the Works; and
- b. Departures from Standard.
- 2.4 Project Co shall ensure the Designer reviews and, where appropriate, proposes amendments to the Design QMS throughout the duration of the Works.
- 2.5 Project Co shall ensure that any proposed amendments to the Design QMS:
- 2.5.1 shall be submitted to TfL for review under the Review Procedure; and
- 2.5.2 may only be implemented once the same have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.
- 3. Quality Management System for Construction**
- 3.1 Project Co shall ensure that the D&C Contractor prepares and submits to Project Co, who shall then submit to TfL under the Review Procedure, a Quality Management System relating to the construction of the Works (the "**Construction QMS**") which shall:
- 3.1.1 be based on the draft set out in Annex 2 (*Draft Quality Management System for Construction*);
- 3.1.2 be developed in accordance with the Project Co Mobilisation Plan; and
- 3.1.3 include all of the matters and comply with all of the requirements set out in paragraph 1 (*General Requirements of Quality Management Systems*) and this paragraph 3 (*Quality Management System for Construction*).
- 3.2 Project Co shall comply with the Construction QMS (including as such may be amended in accordance with paragraph 3.3) which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure and shall ensure all Sub-Contractors involved in the construction of the Works shall comply with the same.

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Part 2 – Quality Management Systems

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- 3.3 Project Co shall ensure that the Construction QMS shall include:
- 3.3.1 procedures for carrying out appropriate trials and testing in accordance with Schedule 9 (*Certification and Review Procedure*) and Annex 1 (*Highways and General Requirements*) of Part 1 (*Design and Construction Requirements*) of Schedule 10 (*Design and Construction Requirements*);
  - 3.3.2 arrangements for including an O&M Contractor in the testing and commissioning process during the Works;
  - 3.3.3 procedures for inspection of the Works by the Designer in order that the Designer may satisfy itself of completion of the Works in accordance with Schedule 9 (*Certification and Review Procedure*), including inspection of any part of the Works prior to it being covered up; and
  - 3.3.4 procedures for uncovering the Works pursuant to paragraph 3.2.9 of Part 1 (*Certification Procedure*) of Schedule 9 (*Certification and Review Procedure*).
- 3.4 Project Co shall ensure the D&C Contractor reviews and, where appropriate, proposes amendments to the Construction QMS throughout the duration of the Works.
- 3.5 Project Co shall ensure that any proposed amendments to the Construction QMS are:
- 3.5.1 submitted to TfL for review under the Review Procedure; and
  - 3.5.2 only implemented once the same have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.
- 4. Quality Management System for Operation and Maintenance**
- 4.1 No later than six (6) months prior to the Permit to Use Date, Project Co shall prepare and submit to TfL under the Review Procedure, a Quality Management System for Operation and Maintenance (the "**O&M QMS**"), which shall:
- 4.1.1 be based on the draft documentation set out in Annex 3 (*Draft Quality Management System for Operation and Maintenance*);
  - 4.1.2 be developed in accordance with and incorporate the requirements of Schedule 18 (*Operations and Maintenance Requirements*); and
  - 4.1.3 include all of the matters and comply with all of the requirements set out in paragraph 1 (*General Requirements of Quality Management Systems*) of Part 2 (*General Requirements of Quality Management Systems*) and this paragraph 4 (*Quality Management System for Operation and Maintenance*).
- 4.2 Project Co shall comply with the O&M QMS (including as such may be amended in accordance with paragraph 4.3) which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure and shall ensure that all Sub-Contractors involved in the Services shall comply with the same.
- 4.3 Project Co shall review and, where appropriate, propose amendments to the O&M QMS throughout the duration of the Availability Period.
- 4.4 Project Co shall ensure that any proposed amendments to the O&M QMS shall be:
- 4.4.1 submitted to TfL for review under the Review Procedure; and

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- 4.4.2 implement only once the same have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.

**Annex 1 of Part 2 – Draft Quality Management System for the Design**

**Commercially sensitive information**

**Annex 2 of Part 2 – Draft Quality Management System for Construction**

**Commercially sensitive information**

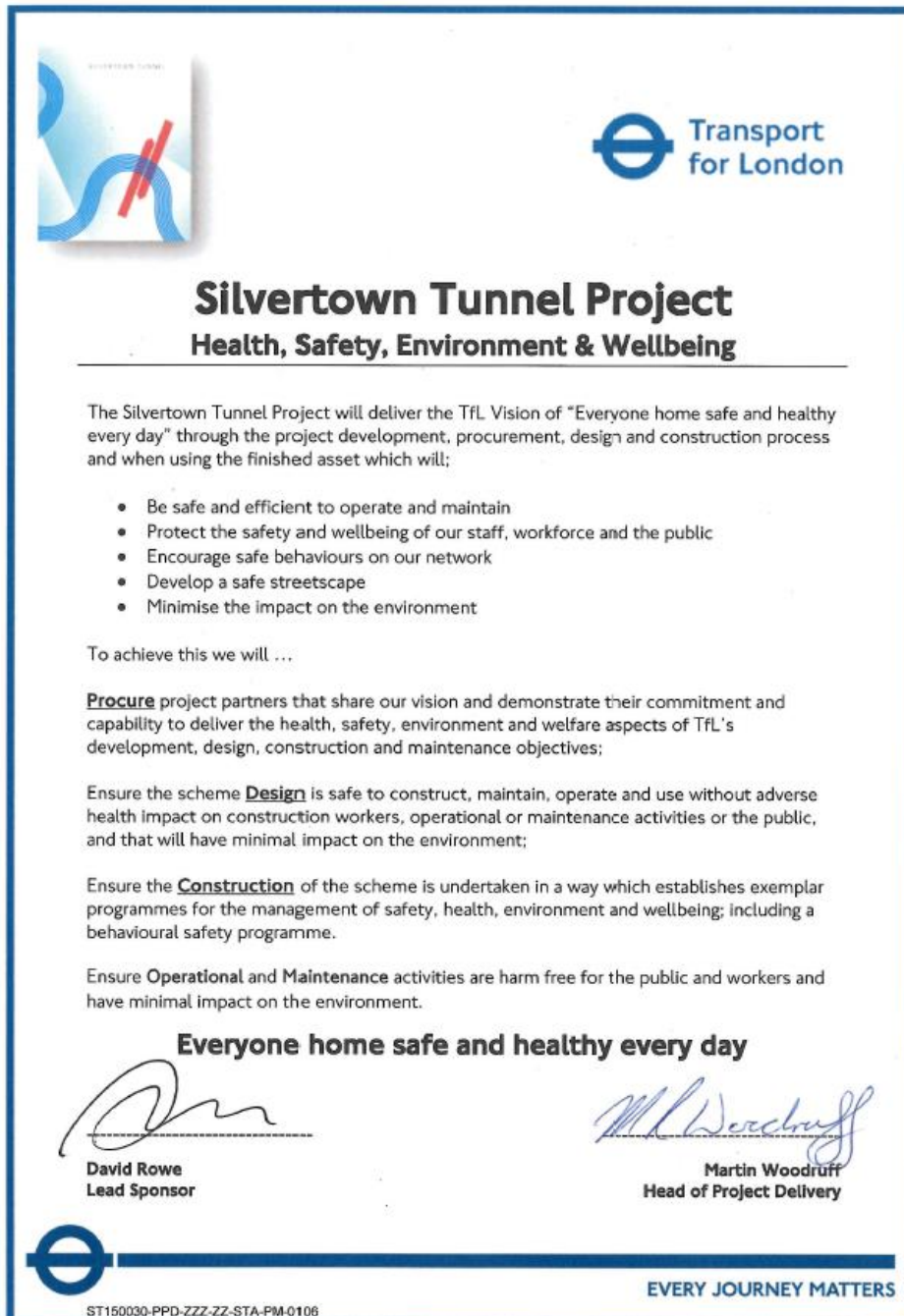
**SCHEDULE 8**

**MANAGEMENT SYSTEMS**

**Part 3 - Health and Safety Management System**

**1. Introduction**

Project Co's health, safety, environment and wellbeing management arrangements shall be informed by and comply with the Project Policy Statement below:



The cover page features the Transport for London logo in the top right corner and a graphic of a tunnel with a red double line on the left. The title "Silvertown Tunnel Project Health, Safety, Environment & Wellbeing" is centered. Below the title, it states the project's vision and lists five key objectives: being safe and efficient, protecting staff and the public, encouraging safe behaviors, developing a safe streetscape, and minimizing environmental impact. It also outlines the project's commitment to Procure, Design, Construction, and Operational/Maintenance activities.

**Silvertown Tunnel Project**  
**Health, Safety, Environment & Wellbeing**

The Silvertown Tunnel Project will deliver the TfL Vision of "Everyone home safe and healthy every day" through the project development, procurement, design and construction process and when using the finished asset which will;

- Be safe and efficient to operate and maintain
- Protect the safety and wellbeing of our staff, workforce and the public
- Encourage safe behaviours on our network
- Develop a safe streetscape
- Minimise the impact on the environment

To achieve this we will ...

**Procure** project partners that share our vision and demonstrate their commitment and capability to deliver the health, safety, environment and welfare aspects of TfL's development, design, construction and maintenance objectives;

Ensure the scheme **Design** is safe to construct, maintain, operate and use without adverse health impact on construction workers, operational or maintenance activities or the public, and that will have minimal impact on the environment;


Ensure the **Construction** of the scheme is undertaken in a way which establishes exemplar programmes for the management of safety, health, environment and wellbeing; including a behavioural safety programme.

Ensure **Operational** and **Maintenance** activities are harm free for the public and workers and have minimal impact on the environment.

**Everyone home safe and healthy every day**

*David Rowe*  
David Rowe  
Lead Sponsor

*Martin Woodruff*  
Martin Woodruff  
Head of Project Delivery

 **EVERY JOURNEY MATTERS**

ST150030-PPD-ZZZ-ZZ-STA-PM-0106

**2. Health and Safety Management System**

- 2.1 Project Co shall develop a health and safety management system detailing its proposed arrangements and structure for managing health, safety and wellbeing during the Project (the "**Health and Safety Management System**") in accordance with the Project Co Mobilisation Plan and shall submit to TfL for review under the Review Procedure.
- 2.2 Project Co shall review and, where appropriate, amend the Health and Safety Management System throughout the duration of the Agreement Period.
- 2.3 Project Co shall ensure that any amendments to the Health and Safety Management System shall be:
- 2.3.1 submitted to TfL for review under the Review Procedure; and
  - 2.3.2 implemented only once the same have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.
- 2.4 Project Co shall comply with the Health and Safety Management System (including as amended in accordance with paragraph 2.2) which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure and perform its obligations under this Agreement in accordance with the Health and Safety Management System.
- 2.5 Project Co shall not commence or permit the commencement of any aspect of the construction of the Works before Health and Safety Management System has been endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure.
- 2.6 Project Co shall ensure the Health and Safety Management System:
- 2.6.1 complies with the requirements of this Part 3 (*Health and Safety Management Requirements*) and details how such compliance will be met;
  - 2.6.2 is based on the draft documentation set out in Annex 1 (*Draft Health and Safety Management System*);
  - 2.6.3 not used;
  - 2.6.4 is ISO 45001 certified by a UKAS accredited certification body within one (1) year of the Effective Date; and
  - 2.6.5 complies with Good Industry Practice.
- 2.7 Project Co shall ensure that all Project Co Related Parties are made aware of their responsibility for:
- 2.7.1 their own safety;
  - 2.7.2 the safety of others; and
  - 2.7.3 ensuring that the activities they undertake are safe and do not place others at risk.

## Schedule 8 – Management Systems

Part 3 – Health and Safety Management System

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- 2.8 Project Co shall ensure that the Health and Safety Management System demonstrates how Project Co will achieve the following health and safety goals in relation to the Project:
- 2.8.1 a 'zero target' injury/incident approach to the management of the Project by ensuring that the Project is carried out safely without detriment to the safety of any person;
  - 2.8.2 a 'zero target' ill-health approach to the management of the Project by ensuring that the Project is carried out safely without detriment to the health of any workers involved in the Project and members of the public;
  - 2.8.3 a 'zero target' rate for services strikes, degradation and damage claims arising from site activity by ensuring that services are clearly identified, safeguarded and provisions made for future access and maintenance;
  - 2.8.4 to establish safe working arrangements, improve Sub-Contractor and supplier awareness of safe working practices, raise standards and promote good practice;
  - 2.8.5 to have effective reporting arrangements in place for all accidents or incidents occurring to any person in connection with the Project in accordance with paragraph 16 (*Accident and Incident Reports*) of Part 2 (*Reports*) of Schedule 16 (*Records and Reporting*); and
  - 2.8.6 to design the Project to reduce, so far as reasonably practicable, the health and safety risks to any person.
- 2.9 Project Co shall set out in the Health and Safety Management System how it proposes to actively promote trials and implement health and safety innovations to support the improvement of good practice and to improve health and safety performance in relation to the Project.
- 2.10 Project Co shall describe its arrangements for complying with clause 13.19 (*CDM Regulations*) and undertaking and discharging the duties specified therein within the Health and Safety Management System.
- 2.11 Project Co shall throughout the Agreement Period manage the interface between Sub-Contractors to ensure that they are aware of, understand and comply with the requirements of this Part 3 (*Health and Safety Management Requirements*).
- 2.12 Project Co shall ensure that all Sub-Contractors and their employees participate in the health and safety initiatives that Project Co and TfL use to review and improve health and safety performance collectively with their supply chains, including the requirement to attend routine health and safety meetings, briefings and Sub-Contractor forums.
- 3. Verification Activities**
- 3.1 Project Co shall establish a programme of active monitoring to ensure that health and safety is adequately managed throughout the Project.

## Schedule 8 – Management Systems

Part 3 – Health and Safety Management System

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- 3.2 Project Co shall ensure that the type and frequency of proactive monitoring activities shall be set out within the Health and Safety Management System and shall include, but not be limited to:
- 3.2.1 management system audits in accordance with Part 1 (*The Project Co Management System*);
  - 3.2.2 senior manager safety tours;
  - 3.2.3 health and safety manager inspections of the Project Land, offices and other relevant facilities;
  - 3.2.4 design risk reviews;
  - 3.2.5 site inspections or visits undertaken by or on behalf of TfL;
  - 3.2.6 risk assessment/method statement reviews; and
  - 3.2.7 lessons learnt sessions, undertaken at the end of each stage.
- 3.3 Project Co shall produce a health and safety dashboard which shall be provided to TfL at the end of each TfL Reporting Period, which shall provide a 'look back' on the previous TfL Reporting Period's health and safety performance and shall include data on the following:
- 3.3.1 All Accident Frequency Rate;
  - 3.3.2 Lost Time Injury Frequency Rate;
  - 3.3.3 number of proactive monitoring assurance activities undertaken in the TfL Reporting Period by type;
  - 3.3.4 number of reactive monitoring assurance activities undertaken in the TfL Reporting Period by type; and
  - 3.3.5 number of closed actions identified from assurance activities.
- 4. Accident and Incident Reporting**
- 4.1 Project Co shall report all incidents, accidents and near miss events which occur during the Project immediately to the TfL infoexchange system or equivalent TfL health, safety and environment report system and where required, the health and safety executive or other third parties and set out arrangements for such reporting in the Health and Safety Management System.
- 4.2 Project Co shall comply with the accident and incident report requirements specified in paragraph 17 (*Accident and Incident Reports*) of Part 2 (*Reports*) of Schedule 16 (*Records and Reporting Requirements*).
- 4.3 Project Co shall submit all accident and incident reports through the TfL infoexchange system or equivalent TfL health, safety & environment reporting system.

**5. Risk Management**

- 5.1 Project Co shall, and shall ensure that its Sub-Contractors shall, implement measures to mitigate and manage risks to as low as reasonably practicable throughout the Project through:
- 5.1.1 robust design and construction risk management;
  - 5.1.2 effective processes for assessing risk and developing safe systems of work;
  - 5.1.3 developing and implementing a construction phase plan and emergency preparedness plan;
  - 5.1.4 developing and implementing a world class behavioural safety programme with full participation by all;
  - 5.1.5 high levels of leadership commitment, supervision and engagement in monitoring and managing the Project;
  - 5.1.6 rectifying deficiencies and continuously improving in relation to health and safety;
  - 5.1.7 personal competency, development and innovation in relation to health and safety;
  - 5.1.8 exemplary standards of health and safety performance and management throughout the Project and compliance with all Applicable Requirements relating to health and safety;
  - 5.1.9 comprehensive occupational health management scheme;
  - 5.1.10 pre start meetings;
  - 5.1.11 ensuring all workers are prepared through site inductions, toolbox talks and daily pre work briefings;
  - 5.1.12 "One Team" culture, honesty, openness and engagement; and
  - 5.1.13 rewarding good performance and challenging poor performance in relation to health and safety.
- 5.2 Project Co shall set out its arrangements for the identification, reduction or elimination, control and communication of design, construction, operation and maintenance risks within the Health and Safety Management System.
- 5.3 For the entire Agreement Period, all identified risks shall be maintained by Project Co on an appropriate risk register and be reviewed at regular intervals as set out in the Health and Safety Management System.
- 5.4 Project Co shall ensure that all risk assessments are undertaken by persons with the appropriate skills, knowledge, experience and resources.



**6. Management of Site Hazards**

- 6.1 For the entire Agreement Period, Project Co shall take appropriate action with regards to hazards commonly associated with a project of this nature, including without limitation, hazards associated with construction sites, works on the public highway and underground works.
- 6.2 Project Co shall consider the hazards identified in the development of the Detailed Design using its design risk management process.
- 6.3 Project Co shall take appropriate action with regards to hazards identified in Pre-Construction Information (as defined in the CDM Regulations).
- 6.4 Project Co shall undertake its own site surveys prior to starting the Works to enhance and verify the existing Pre-Construction Information (as defined in the CDM Regulations) and identify site hazards.
- 6.5 Project Co shall ensure that it properly communicates hazards through models, drawings, risk registers or other means and controls residual risks using risk assessments, method statements and activity plans as part of a safe system of work so that they are understood by all relevant Project Co Related Parties.
- 6.6 Project Co shall manage the risk of release of asbestos during alteration, demolition and excavation works in accordance with The Control of Asbestos Regulations 2012 and associated codes of practice and all Applicable Requirements.

**7. Health and Safety Training and Advice**

- 7.1 Project Co shall set out within the Health and Safety Management System its arrangements for ensuring the effective delivery of health and safety training at all stages of the Project for all relevant Project Co Related Parties.
- 7.2 Project Co shall ensure training is provided as early as reasonably practicable to raise awareness of how health and safety initiatives can be incorporated into the Project to maximise performance in health and safety.
- 7.3 Project Co shall ensure training and induction incorporates demonstration by example of good practice and the impact of poor practice.
- 7.4 Project Co shall ensure health and safety induction, training and assessment includes, but is not limited to:
- 7.4.1 specific training to ensure relevant staff and contractors are aware of the required mitigation measures detailed in the construction phase plan;
  - 7.4.2 site induction of all relevant Project Co Related Parties carrying out activities on, and visitors to, the Project Land; and
  - 7.4.3 any other training appropriate to the activities taking place before any person starts that activity on the Project Land.
- 7.5 Project Co shall ensure that systems are in place to ensure all inductions and training are implemented effectively and that:

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- 7.5.1 the persons providing inductions and training have received adequate training to do so; and
  - 7.5.2 inductions and training are carried out in a suitable place with appropriate visual aids.
  - 7.6 Project Co shall maintain a written record of attendance for inductions, training and safety briefings.
  - 7.7 Project Co shall set out within the Health and Safety Management System the arrangements for ensuring that those with learning, reading and language difficulties are appropriately assisted in all training and inductions.
  - 7.8 Subject to paragraph 7.9, Project Co shall ensure that:
    - 7.8.1 all employees, Sub-Contractors, suppliers and other persons entering a construction site in relation to the Project are in possession of a valid Construction Skills Certification Scheme ("**CSCS**") card; and
    - 7.8.2 the CSCS card held by any individual is appropriate to their specific job task(s).
  - 7.9 Where an individual holds a valid card from a CSCS affiliated or amalgamated scheme or other accepted scheme which has been assessed as meeting similar standards, special dispensation may be given by Project Co to provide access to visitors when on an accompanied site visit.
  - 7.10 Project Co shall ensure that all staff, including TfL staff, Sub-Contractors, visitors and any other persons involved in the Project are provided with appropriate personal protective equipment and clothing for use on the Project Land, in accordance with the UK's latest version of the personal protective equipment regulations.
  - 7.11 Project Co shall ensure that:
    - 7.11.1 adequately resourced competent health and safety advice and assistance is provided to all Project Co Related Parties carrying out the Works and Services; and
    - 7.11.2 arrangements for ensuring and maintaining competent health and safety advice will be described within the Health and Safety Management System.
- 8. First Aid, Occupational Health, Drugs and Alcohol**
- 8.1 Project Co shall set out in the Health and Safety Management System suitable and sufficient arrangements for first aid based on the:
    - 8.1.1 nature and size of the Project;
    - 8.1.2 size and distribution of the workforce;
    - 8.1.3 needs of travelling, remote and lone workers;
    - 8.1.4 hours of work; and
    - 8.1.5 multi-occupied worksites.

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Part 3 – Health and Safety Management System

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- 8.2 Project Co shall set out within the Health and Safety Management System its arrangements for ensuring access to an occupational health service at all times during the Project, including suitable occupational health protocols for:
- 8.2.1 hand-arm vibration syndrome surveillance during the Works;
  - 8.2.2 fatigue management;
  - 8.2.3 stress management; and
  - 8.2.4 respiratory health.
- 8.3 Project Co shall use and consult specialist providers, where necessary, to promote health surveillance, health awareness and general occupational health arrangements.
- 8.4 Project Co shall provide the following occupational health services for each individual engaged in relation to the Project by Project Co Related Parties on the Project Land:
- 8.4.1 pre-employment medicals;
  - 8.4.2 health questionnaires on commencement;
  - 8.4.3 specific health appraisals for those referred following evaluation of questionnaires;
  - 8.4.4 specific health surveillance for those requiring it where identified under regulations and/or risk assessment;
  - 8.4.5 occupational hygiene services to support and assess ill health prevention management;
  - 8.4.6 contributing to the effectiveness of attendance management, rehabilitation and return-to-work programmes and support for ill health incidence investigation where necessary; and
  - 8.4.7 health promotion programmes applicable to construction operatives' workplace, lifestyle and wellbeing.

**9. Behavioural Safety**

- 9.1 Project Co shall include in the Health and Safety Management System a behavioural based safety programme for the Project with the aims of:
- 9.1.1 leading by example;
  - 9.1.2 increasing awareness of behaviours;
  - 9.1.3 developing a no name/no blame culture with the workforce;
  - 9.1.4 recognising and rewarding safe behaviour;
  - 9.1.5 challenge and manage unsafe behaviour;
  - 9.1.6 identifying and remove hazards;

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- 9.1.7 providing positive observations and feedback;
  - 9.1.8 reducing at risk behaviours/conditions; and
  - 9.1.9 increasing immediate corrective action.
- 9.2 For the duration of the Works, Project Co shall appoint (and shall ensure that its Subcontractors appoint (where appropriate)) behavioural safety leaders from within its workforce or the workforce of a Project Co Related Party. The behavioural safety leaders shall be required to:
- 9.2.1 attend behavioural safety briefings;
  - 9.2.2 manage behavioural safety logs;
  - 9.2.3 lead by example and embody the values of behavioural safety;
  - 9.2.4 walk the Site (in accordance with the frequency which Project Co shall ensure is specified in the Health and Safety Management System) and raise all safety concerns;
  - 9.2.5 raise awareness and brief others undertaking activities on the Project Land on behavioural safety and encourage all to raise safety concerns, remove hazards as they find them and record and report them as required; and
  - 9.2.6 attend behavioural safety leader meetings.
- 9.3 For the duration of the Works, Project Co shall undertake a safety culture survey of the workforce and staff quarterly which shall be based on an industry recognised survey tool.
- 9.4 Project Co shall report on the progress towards a world class safety culture based upon the findings of each quarterly review at the Assurance Review Meetings in accordance with Schedule 15 (*Design & Construction Performance Monitoring*).

**10. Health and Safety Information**

- 10.1 Throughout the Agreement Period, Project Co shall produce, cascade, communicate and circulate health and safety alerts and communications to all levels of the workforce and TfL, and retain records of those being briefed.
- 10.2 Project Co shall set out in the Health and Safety Management System how it will ensure adequate distribution of health and safety information on the Project.
- 10.3 Project Co shall ensure that for the duration of the Project:
  - 10.3.1 health and safety records relevant to the Works and Services, including induction, training and equipment inspection and testing records, are kept on site and are available for inspection on request in accordance with Part 1 (*Records*) of Schedule 16 (*Records and Reporting Requirements*);
  - 10.3.2 copies of all relevant health and safety information particular to worksite activities are held by the team carrying out the work, including method statements, risk assessments, written briefings, permits to work and safety alerts/bulletins;

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- 10.3.3 site safety briefings are provided to all persons carrying out work tasks subject to method statement, risk assessments and permit controls and written records maintained of briefings signed by all persons carrying out the tasks (these briefings are completed daily and when the task or condition changes);
  - 10.3.4 visualisation boards or other means are used to communicate health and safety information at each site or work area entrance and where daily group briefings take place; and
  - 10.3.5 suitable means for communicating task specific briefings are available at the location where work is to be carried out by the individual task team.
- 10.4 Project Co shall set out within the Health and Safety Management System arrangements for ensuring that health and safety information is effectively communicated and understood by all non-fluent English speaking staff and contractors.

**11. Site Supervision**

- 11.1 Project Co shall set out arrangements for supervision and management of the Works in the Health and Safety Management System and shall ensure that supervision arrangements for the Works:
- 11.1.1 ensure the Works are suitably supervised at all times by competent persons and that operatives are aware of the person supervising their work activities and their whereabouts at all times;
  - 11.1.2 ensure persons appointed to supervisory and management positions have the necessary skills, knowledge and experience for the role and are regularly assessed throughout the Works;
  - 11.1.3 supervisors receive inductions on the health and safety requirements and of their specific responsibilities for health and safety aspects;
  - 11.1.4 address the supervision of those new to working on the Project and any others at particular risk;
  - 11.1.5 address foreseeable emergencies;
  - 11.1.6 are suitable and adequate for any lone or isolated work; and
  - 11.1.7 ensure all Project Co Related Parties who have supervisory responsibilities for others hold a current "Construction Industry Training Board Site Supervisors Safety Training Scheme" certificate (or equivalent agreed by TfL); and
  - 11.1.8 ensure all persons with management responsibilities and all those who are responsible for managing a worksite or managing the activities of others (including those from Sub-Contractors and suppliers of any tier) hold a current "Construction Industry Training Board Site Management Safety Training Scheme" certificate (or equivalent agreed by TfL).
- 11.2 Project Co acknowledges that:
- 11.2.1 for the purposes of paragraph 11.1.7, persons considered to have supervisory responsibilities are those involved in the direction of day-to-day work activities

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## Schedule 8 – Management Systems

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with direct responsibility for putting people to work, who typically brief the workers on how to carry out their work and ensure that they are carrying out their work safely; and

11.2.2 for the purposes of paragraph 11.1.8, construction directors, construction managers, site agents, sub-agents, site managers/engineers, and senior supervisors such as general foreman and works managers are considered to be persons having management responsibilities.

**12. Welfare Arrangements**

- 12.1 Project Co shall provide welfare facilities for the entire Agreement Period to all Project Co Related Parties carrying out activities on the Project Land in accordance with the provisions of this paragraph 12 (*Welfare Arrangements*) in order to support the overall occupational health programme and shall set out its welfare arrangements in the Health and Safety Management System.
- 12.2 Project Co shall provide welfare facilities at multiple locations across the Project Land to ensure easy access for workers.
- 12.3 Project Co shall ensure that from the Effective Date until the Permit to Used Date, welfare facilities include but are not limited to the facilities outlined in Health and Safety Executive Construction Information Sheet (CIS) 59.
- 12.4 Project Co shall ensure that during the Availability Period welfare facilities comply with the requirements set out in the Workplace (Health, Safety and Welfare) Regulations 1992.
- 12.5 From the Effective Date until the Permit to Used Date, Project Co shall provide canteen facilities which are registered with the local authority and have a minimum rating of four (4) against the Food Standards Agency Food Hygiene Rating Standard.

**13. Construction Plant and Equipment**

- 13.1 Project Co shall set out competency requirements for all plant and equipment operators in the Health and Safety Management System, including arrangements for review and assessment of competence in accordance with Provision and Use of Work Equipment Regulations 1998.
- 13.2 Project Co shall ensure that all plant and equipment operators have the skills, knowledge and experience and hold a valid construction plant competence scheme card for the plant/equipment they operate.
- 13.3 Project Co shall ensure that all plant and equipment, including hired plant/equipment, is maintained, inspected and tested in accordance with manufacturers' instructions and all Applicable Requirements.
- 13.4 Project Co shall ensure that:
- 13.4.1 all plant/equipment is only maintained by personnel qualified to do so;
  - 13.4.2 consideration is given to noise and vibration, recording of exposure to vibration and monitoring of noise generated; and
  - 13.4.3 the results from all maintenance, inspections and tests are recorded.

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**14. Work Related Road Risk**

- 14.1 Project Co recognises the requirements relating to TfL's Work Related Road Risk scheme ("**WRRR**") in the Code of Construction Practice.
- 14.2 Where Project Co operates delivery and/or servicing vehicles to carry out the Project, Project Co shall, within ninety (90) days of the Effective Date, produce a written report to TfL detailing its compliance with the WRRR requirements (the "**WRRR Self-Certification Report**") which shall also detail the compliance by members of the supply chain employed on the Project, including as a minimum the following details:
- 14.2.1 whether each of the supply chain members is meeting all, some or none of the WRRR requirements;
  - 14.2.2 the supply chain members meeting the safer operator requirements showing the split between vehicles under and over 3.5 tonnes;
  - 14.2.3 the supply chain members meeting the safer driver requirements showing the split between vehicles under and over 3.5 tonnes and the following details:
    - a. drivers having completed Safe Urban Driving or equivalent within the last five (5) years;
    - b. drivers having completed at least one module of Fleet Operator Recognition Scheme ("**FORS**") eLearning within the last twelve (12) months; and
    - c. drivers having completed the full training requirements; and
  - 14.2.4 the supply chain members meeting the safer vehicle requirements in relation to vehicles over 3.5 tonnes only and showing the following details:
    - a. vehicles minimising the blind spot to meet the Direct Vision Standards;
    - b. vehicles fitted with an audible left turn warning alert;
    - c. vehicles meeting the requirements of the safer lorry scheme; and
    - d. vehicles fitted with all safety features set out in the WRRR requirements.
- 14.3 Project Co shall provide updates of the self-certification to TfL every three (3) months from the initial WRRR Self-Certification Report referred to in paragraph 14.2 until the end of the Agreement Period.
- 14.4 Within one (1) year of the Effective Date, Project Co shall attain and maintain FORS "Gold Accreditation" and shall ensure that any Sub-Contractors have obtained FORS "Gold Accreditation" prior to undertaking any physical Works or Services in connection with the Project.

**15. Construction Phase Plan**

- 15.1 Project Co shall ensure that a Construction Phase Plan (as defined in the CDM Regulations):
- 15.1.1 has been prepared and provided to TfL in accordance with the Project Co Mobilisation Plan; and

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- 15.1.2 is based on the draft documentation set out in Annex 2 (*Draft Construction Phase Plan*).
- 15.2 Project Co shall verify the content and quality of the Construction Phase Plan through the production of a Construction Phase Plan checklist and shall ensure this is provided to TfL.
- 15.3 Project Co may use the TfL template, STMS0036F3, or produce a checklist format of its own for the purposes of producing the Construction Phase Plan.

**16. Health and Safety Executive**

- 16.1 Within thirty (30) Working Days of the Effective Date, Project Co:
- 16.1.1 may request initial contact details for the relevant Health & Safety Executive ("**HSE**") inspectorate team from TfL; and
- 16.1.2 shall engage with the relevant HSE inspectorate to enable the HSE to develop a health and safety intervention strategy for the Works.
- 16.2 For the purposes of paragraph 16.1, Project Co shall provide the HSE with all information, access and any other support required or otherwise requested by the HSE to allow effective development and implementation of their health and safety intervention strategy.
- 16.3 Project Co shall provide TfL with all current details of the HSE intervention strategy for the duration of the Works.
- 16.4 Promptly after each HSE visit in relation to the Project, Project Co shall provide TfL with a report setting out in detail the nature of the visit, along with a corrective action plan where any shortfalls were identified by either Project Co, the HSE or any other party during such visit.
- 16.5 Where a corrective action plan is supplied pursuant to paragraph 16.4, Project Co shall comply with such plan and promptly implement any corrective actions identified.

**17. Designer and Principal Designer processes and arrangements**

- 17.1 Project Co shall prepare and submit to TfL for review under the Review Procedure its proposed processes and arrangements for demonstrating how the duties of Designer and Principal Designer (each as defined in the CDM Regulations) will be discharged, which shall be based on the draft set out in Annex 3 (*Draft Designer and Principal Designer processes and arrangements*).
- 17.2 Project Co shall comply with the processes and arrangements described in paragraph 17.1 (including as such may be amended in accordance with paragraph 17.3) which are endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure.
- 17.3 Project Co shall where appropriate propose amendments to the processes and arrangements described in paragraph 17.1 throughout the duration of the Works.
- 17.4 Project Co shall ensure that any proposed amendments to the processes and arrangements described in paragraph 17.1:
- 17.4.1 shall be submitted to TfL for review under the Review Procedure; and

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17.4.2 may only be implemented once the same have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.

**18. Principal Contractor processes and arrangements**

18.1 Project Co shall prepare and submit to TfL for review under the Review Procedure its proposed processes and arrangements for demonstrating how the duties of Principal Contractor (as defined in the CDM Regulations) will be discharged, which shall be based on the draft set out in Annex 4 (*Draft Principal Contractor processes and arrangements*).

18.2 Project Co shall comply with the processes and arrangements described in paragraph 18.1 (including as such may be amended in accordance with paragraph 18.3) which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure.

18.3 Project Co shall where appropriate propose amendments to the processes and arrangements described in paragraph 18.1 throughout the duration of the Works.

18.4 Project Co shall ensure that any proposed amendments to the processes and arrangements described in paragraph 18.1:

18.4.1 shall be submitted to TfL for review under the Review Procedure; and

18.4.2 may only be implemented once the same have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.

**Annex 1 of Part 3 – Draft Health and Safety Management System**

**Commercially sensitive information**

**Annex 2 of Part 3 – Draft Construction Phase Plan**

**Commercially sensitive information**

**Annex 3 of Part 3 – Draft Designer and Principal Designer processes and arrangements**

**Commercially sensitive information**

**Annex 4 of Part 3 – Principal Contractor processes and arrangements**

**Commercially sensitive information**

**SCHEDULE 8****MANAGEMENT SYSTEMS****Part 4 - Environmental Management System****1. General Requirements**

- 1.1 Project Co shall develop an environmental management system in accordance with the Project Co Mobilisation Plan and the provisions of this Part 4 (*Environmental Management System*) (the "**Environmental Management System**") and submit to TfL for review under the Review Procedure.
- 1.2 Project Co shall comply with the Environmental Management System (including as amended in accordance with paragraph 1.6) which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure and perform its obligations under this Agreement in accordance with the Environmental Management System.
- 1.3 Project Co shall not commence or permit the commencement of any aspect of the construction of the Works before the Environmental Management System has been endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure.
- 1.4 Project Co shall ensure its Environmental Management System:
- 1.4.1 complies with the requirements of Schedule 12 (*Environmental Requirements*) and this Part 4 (*Environmental Management System*) and details how such compliance will be met;
  - 1.4.2 is based on the draft documentation set out in Annex 1 (*Draft Environmental Management System*);
  - 1.4.3 is developed in accordance with the ISO14000 series;
  - 1.4.4 is ISO 14001 certified by a UKAS or equivalent ISO accredited certification body within one (1) year of the Effective Date; and
  - 1.4.5 complies with Good Industry Practice.
- 1.5 Project Co shall ensure the Environmental Management System incorporates:
- 1.5.1 a construction environmental management plan ("**CEMP**") in accordance with paragraph 7 (*Construction Environmental Management Plan*); and
  - 1.5.2 an operation and maintenance environmental management plan ("**OMEMP**") in accordance with paragraph 22 (*Operation and Maintenance Environmental Management Plan*).
- 1.6 Project Co shall review and, where appropriate, propose amendments to the Environmental Management System throughout the duration of the Agreement Period.
- 1.7 Project Co shall ensure that any amendments to the Environmental Management System shall be:
- 1.7.1 submitted to TfL for review under the Review Procedure; and

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Part 4 – Environmental Management System

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- 1.7.2 may only be implemented once the same have been endorsed by TfL as "received" or "received with comments" in accordance with the Review Procedure.

**2. Environmental Monitoring and Reporting**

- 2.1 Project Co shall include in the Environmental Management System details of arrangements for the preparation and implementation of a programme of environmental monitoring.

- 2.2 Project Co shall provide details in the Environmental Management System of the arrangements for regular progress reports to TfL (the "**Environmental Performance Reports**") on the results of environmental monitoring and on other environmental matters during:

2.2.1 the Works as part of the Design and Construction Report required in accordance with Schedule 16 (*Records and Reporting*); and

2.2.2 the Services as part of the Operation and Maintenance Report required in accordance with Schedule 16 (*Records and Reporting*).

- 2.3 Project Co shall ensure that the Environmental Performance Reports include details of:

2.3.1 CEMP development and approval status of sections thereof;

2.3.2 environmental design management procedure performance;

2.3.3 monitoring results;

2.3.4 Notifiable Environmental Incidents;

2.3.5 non-compliances and corrective actions taken;

2.3.6 approvals obtained under the relevant environmental Transferred DCO Functions;

2.3.7 training provided and planned; and

2.3.8 performance indicators against environmental targets.

- 2.4 Project Co shall ensure that monitoring protocols and minimum requirements of the monitoring shall be included within the relevant Environmental Management Plans.

**3. Environmental Registers**

- 3.1 Project Co shall include in the Environmental Management System details of the arrangements for the review and maintenance of the following registers throughout the Agreement Period:

3.1.1 background environmental information;

3.1.2 environmental risks register (which may be a discrete part of the project risk register) and associated procedures, which show how environmental risks will be addressed;

- 3.1.3 environmental inspection, monitoring and audit register which shall include:
  - a. actions to be implemented in order to assess the effectiveness of environmental management (monitoring, inspections or audit);
  - b. responsibilities and timeframes for carrying out monitoring, inspections, or audit;
  - c. status of the implementation of monitoring, inspections or audit; and
  - d. status of achievement of objectives and targets;
- 3.1.4 environmental impacts and aspects register, which shall be a compilation of all environmental impacts and aspects potentially arising during the Project;
- 3.1.5 environmental commitments register, which shall include all environmental commitments in (or as a result of) the Transferred DCO Functions and in the Project Agreement that Project Co is obligated to comply with, and which shall identify:
  - a. the nature of the commitments;
  - b. the entity with which they were agreed;
  - c. their fulfilment status; and
  - d. references to any relevant documentation; and
- 3.1.6 list of consultees.
- 3.2 The registers listed in paragraph 3.1 shall be developed by Project Co from the initial registers, lists and background information included in the DCO Application.

#### **4. Environmental Design Management**

- 4.1 Project Co shall prepare an environmental design management procedure (the "**EDM Procedure**") which shall be included in the Environmental Management System and implemented throughout the design process, including design development, design finalisation and any changes to designs throughout the Works and Services.
- 4.2 Project Co shall ensure that the EDM Procedure is integrated with the Design QMS.
- 4.3 Project Co shall, in accordance with paragraph 1.4.9 of the Code of Construction Practice and in accordance with the Transferred DCO Functions relating to the Environmental Statement ("**ES**"), demonstrate in its EDM Procedure how it will identify any significant change to the environmental impacts identified in the Environmental Statement , resulting from changes to the design and/or construction methods assessed in the ES.
- 4.4 Where there are any changes referred to in paragraph 4.3 Project Co shall reassess these and any resulting modifications in mitigation will require consultation and approval from TfL (such approval not to be unreasonably withheld or delayed) and relevant regulatory authorities as appropriate.
- 4.5 Project Co shall demonstrate in its EDM Procedure how it will:

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- 4.5.1 reduce whole life environmental impacts as far as reasonably practicable. This shall include energy management and assessment of impacts of the design on construction strategy and consequent energy impacts;
- 4.5.2 ensure material usage, energy usage and waste are minimised, which shall include considering the use of cleaner technologies and fuels, such as hydrogen and fuel cells, hybrid technologies, emissions abatement equipment and renewables;
- 4.5.3 address the environmental requirements for the design of the Works in this Agreement;
- 4.5.4 ensure that the design meets the environmental requirements detailed in the ES and Code of Construction Practice, including the achievement of a high standard in the mitigation of adverse environmental effects; and
- 4.5.5 comply with the hierarchy of waste management to avoid, reduce, remedy, or compensate significant risks and impacts identified in its environmental risk register, and its environmental impacts and aspects register.

**5. Sustainability**

- 5.1 Project Co shall ensure that the Environmental Management System provides a framework that permits sustainable development of the Project and shall include in the Environmental Management System a sustainability statement in accordance with the requirements of this paragraph 5 (*Sustainability*) (the "**Sustainability Statement**").
- 5.2 The Sustainability Statement shall be developed by Project Co from the initial sustainability statement included in the DCO Application and shall set out how Project Co will address and where possible improve upon the sustainability commitments provided in the DCO Application and the DCO.
- 5.3 Project Co shall demonstrate in its Sustainability Statement how it will incorporate sustainability into the design of the Works through conservation of energy, materials, water and other resources and promote a sustainable approach to construction.
- 5.4 Project Co shall demonstrate in its Sustainability Statement how it will achieve good practice for sustainable development, in particular the guidance by the industry promoter CIRIA for sustainable construction methods and the Construction Industry Council, in performing the Project.

**6. Environmental Manager and Environmental Team**

- 6.1 For the duration of the Works, Project Co shall appoint a suitably qualified and experienced environmental manager (the "**Environmental Manager**") and environmental team (the "**Environmental Team**").
- 6.2 Project Co shall set out the details of the Environmental Manager and Environmental Team in the Environmental Management System.
- 6.3 Project Co shall ensure that the Environmental Manager is a corporate member of an institution with recognised ability in environmental management, with five (5) years' relevant construction environmental management experience.

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- 6.4 The identity of the Environmental Manager (and any replacement) and their job specification and responsibilities shall be subject to the prior approval of TfL (such approval not to be unreasonably withheld or delayed).
- 6.5 Project Co shall ensure that, without limitation to the foregoing, the job specification and responsibilities of the Environmental Manager shall include:
- 6.5.1 establishing, maintaining and implementing the CEMP and all other environmental plans related to the Works;
  - 6.5.2 establishing an internal monitoring, audit and reporting regime;
  - 6.5.3 leading the appointment of environmental specialists and ensuring that all specialist staff employed are appropriately qualified and suitably experienced to undertake the required tasks;
  - 6.5.4 developing training material, identifying and reviewing training needs and recording environmental training delivered to personnel within the project team in accordance with paragraph 21 (*Environmental Training Plan*);
  - 6.5.5 setting up a programme for environmental audits and site inspections to ensure that identified and appropriate control measures are effective;
  - 6.5.6 ensuring the design and construction of the Works are carried out in compliance with the CEMP;
  - 6.5.7 providing environmental reporting in accordance with the requirements of Schedule 15 (*Design and Construction Performance Monitoring*) and Schedule 16 (*Records and Reporting*), and other objectives proposed by Project Co; and
  - 6.5.8 acting as a main point of contact between relevant regulatory authorities and the Project on environmental issues.
- 6.6 The Environmental Team shall be established by appointing persons to be available at all times to advise on all environmental issues, including ecology, landscape architecture, landscape management, arboriculture, archaeology, noise, vibration, air quality, contaminated land, waste, hydrology, water quality, groundwater, surface water, biodiversity, geology, archaeology and built heritage.
- 6.7 Project Co shall ensure the following are appointed to the Environmental Team who shall, as a minimum, have the following qualifications and experience:
- 6.7.1 an ecologist, who shall be a full corporate member of either the Chartered Institute of Ecology and Environmental Management, Landscape Institute (Science Division) or the Society for the Environment provided the latter was achieved through a relevant constituent body and who shall have a minimum of three (3) years' relevant post qualification experience;
  - 6.7.2 an archaeologist, who shall be a member of the Institute of Field Archaeologists or its equivalent with a minimum of three (3) years' post qualification experience;

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- 6.7.3 a landscape manager, who shall be a full corporate member of the Landscape Institute (Design Division) or equivalent with a minimum of three (3) years' relevant post qualification experience;
- 6.7.4 a hydrologist, who shall be a full member of the Chartered Institution for Water and Environmental Management or equivalent with a minimum of three (3) years' relevant post qualification experience;
- 6.7.5 a water quality specialist who shall be a full member of the Chartered Institution for Water and Environmental Management, or a chartered chemist and member of the Royal Society of Chemistry or their equivalent with a minimum of three (3) years' relevant water quality experience;
- 6.7.6 an air quality specialist, who shall be a chartered member of the Chartered Institute for Air Quality Management with a minimum of three (3) years' relevant air quality experience;
- 6.7.7 a noise specialist, who shall be a member of the Institute of Acoustics or equivalent with a minimum of three (3) years' relevant experience including expertise in tunnelling/ground borne noise and vibration;
- 6.7.8 a geologist or a geotechnical engineer who shall be a chartered geologist of the Geological Society or equivalent with a minimum of three (3) years' relevant experience including expertise in hydrogeology; and
- 6.7.9 a waste manager with a minimum of three (3) years' relevant experience.
- 6.8 For appointees of the Environmental Team where no qualifications or experience is specified in paragraph 6.7 of Part 4 (*Environmental Design Management*), Project Co shall demonstrate in the CEMP that those appointees are competent to carry out their respective functions.

**7. The Construction Environmental Management Plan**

- 7.1 Project Co shall develop and implement the CEMP, for the duration of the Works, in accordance with the Project Co Mobilisation Plan, which shall:
- 7.1.1 include all of the matters and comply with all of the requirements set out in this paragraph 7 (*The Construction Environmental Management Plan*);
- 7.1.2 comply with the requirements of Schedule 12 (*Environmental Requirements*);
- 7.1.3 be in accordance with the relevant requirements of the Transferred DCO Functions relating to the CEMP; and
- 7.1.4 be based on the draft CEMP included as Annex 2 (*Draft Project Co Construction Environmental Management Plan*).
- 7.2 Project Co shall ensure that the CEMP is submitted as part of the Environmental Management System to TfL for review under the Review Procedure and shall comply with the CEMP (including as amended in accordance with paragraph 7.4 and 7.5) which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure and perform its obligations under this Agreement in accordance with the CEMP.

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- 7.3 Project Co shall demonstrate, within the CEMP, how it will monitor compliance with the procedures, standards and other measures required to meet the environmental protection and performance requirements described in this Agreement including, without limitation, Schedule 12 (*Environmental Requirements*).
- 7.4 Project Co shall update the CEMP as required by any Applicable Requirements or when there is a change in the Works in accordance with this Agreement to reflect changes and additions as appropriate.
- 7.5 Project Co shall, at a minimum, review and update the CEMP every six (6) months and ensure that each update shall be submitted to TfL for review under the Review Procedure.
- 7.6 Project Co shall ensure that the CEMP includes details of:
- 7.6.1 procedure(s) setting out how internal communication will be programmed, managed and documented in respect of all environmental matters, which shall include a list of all the project procedures as a reference document;
  - 7.6.2 procedures for addressing environmental non-compliance and corrective actions;
  - 7.6.3 procedure(s) for identifying and documenting environmental information (including information obtained during the Works);
  - 7.6.4 a list of the subsidiary environmental management plans produced in accordance with this Part 4 (*Environmental Management Systems*); and
  - 7.6.5 environmental Key Performance Indicators in accordance with Schedule 15 (*Design & Construction Performance Monitoring*).
- 7.7 Project Co shall ensure that the CEMP includes a number of subsidiary environmental management plans (the "**Environmental Management Plans**") to be produced by Project Co in accordance with the relevant requirements of this Part 4 (*Environmental Management Systems*) including, but not limited to:
- 7.7.1 emergency plan (including emergency spill response plan);
  - 7.7.2 fire plan;
  - 7.7.3 construction traffic management plan;
  - 7.7.4 passage plan;
  - 7.7.5 construction site river strategy;
  - 7.7.6 Air Quality Management Plan;
  - 7.7.7 archaeological written scheme of investigation;
  - 7.7.8 ecology management plan;
  - 7.7.9 construction materials management plan;
  - 7.7.10 groundwater monitoring and verification plan;

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- 7.7.11 noise and vibration management plan;
  - 7.7.12 lighting management plan;
  - 7.7.13 site waste management plan; and
  - 7.7.14 environmental training plan.
- 7.8 Project Co shall provide in the CEMP details of the arrangements to ensure that environmental monitoring results inform corrective action and updates to the relevant subsidiary Environmental Management Plans as necessary.
- 7.9 Project Co shall ensure that where disciplines have considerable cross-over, such as ecology, water and landscape, the monitoring results shall be used to inform each Environmental Management Plan.
- 7.10 Project Co shall ensure that the CEMP includes details of the arrangements for recording monitoring results, in a suitable and compatible electronic or hard copy format for databases as required by Relevant Authorities.

**8. Emergency Plan**

- 8.1 Project Co shall produce an emergency plan (including emergency spill response plan) in accordance with the relevant requirements of the Transferred DCO Functions relating to the emergency plan and this paragraph 8 (*Emergency Plan*) and shall ensure it includes:
- 8.1.1 the emergency arrangements for the Works and activities on site (including entry to confined spaces and working on/adjacent to structures);
  - 8.1.2 an emergency management structure which details the roles, responsibilities and notification procedures for emergency services and other relevant parties;
  - 8.1.3 plans for the identification, definition, categorisation, notification, response, management, reporting, review and investigation of incidents occurring during the Works;
  - 8.1.4 potential impacts beyond the site boundary, in particular where there are interfaces with the road network;
  - 8.1.5 procedures for ensuring staff as familiar with the Site and plans for training arrangements for the staff of Project Co, Project Co Related Parties and any other relevant person; and
  - 8.1.6 plans for simulated emergency exercises.
- 8.2 Project Co shall conduct at least one (1) simulated emergency exercise in each six (6) month period, including one (1) simulated emergency exercise carried out in consultation with the Emergency Services in every twelve (12) month period, from the start of Major Works until the Permit to Use Date.
- 8.3 Project Co shall ensure that the output from the simulated exercises referred to in paragraph 8.2 shall be recorded and reviewed and, where necessary, Project Co shall update the emergency plan referred in paragraph 8.1 after each simulated emergency exercise.

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**9. Fire Plan**

9.1 Project Co shall produce a fire plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the fire plan and this paragraph 9 (*Fire Plan*) and shall ensure it covers how incident management requirements will be met by including details in relation to:

9.1.1 fire risk assessments identifying the nature and level of risk for the scope of Works in accordance with the Regulatory Reform (Fire Safety Order), Fire Safety on Construction Sites (HSG168) published by the Health and Safety Executive, "Fire Prevention on Construction Sites: The Joint Code of Practice" published by the Fire Protection Association and BS6164 Code of practice for health and safety in tunnelling in the construction industry;

9.1.2 site access points, which shall be designed to the requirements of LFEPA Publication: Fire Safety Guidance Note Number 29 Access for Fire Appliances and additionally be suitable for access for ambulances;

9.1.3 communications equipment, including radio equipment to enable firefighters attending emergency incidents below ground to use their normal radio equipment to communicate;

9.1.4 fire fighting water supply system that has been design, installed, maintained and tested in accordance with BS9990:2015 and BS6164:2011;

9.1.5 a simplified pack of reception point information that is immediately available for the London Fire Brigade during an incident, containing as a minimum key contact information A3 sized laminated site plans and sections for all levels with identified hazards and equipment, and key/security cards for personnel access;

9.1.6 fire prevention and fire precautions training for all Project Co Related Parties carrying out activities on the Project Land, including fire wardens/marshals and training for key emergency management personnel as required for the effective implementation of the procedures; and

9.1.7 how the requirements within the above provisions will be maintained and tested as appropriate,

(the "**Fire Plan**").

**10. Construction Traffic Management Plan**

10.1 Project Co shall produce a construction traffic management plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the Construction Traffic Management Plan.

**11. Passage Plan**

11.1 Project Co shall produce a passage plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the passage plan.

**12. Construction Site River Strategy**

- 12.1 Project Co shall produce a construction site river strategy in accordance with the relevant requirements of the Transferred DCO Functions relating to the construction site river strategy.

**13. Air Quality Management Plan**

- 13.1 Project Co shall produce an air quality management plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the air quality management plan and this paragraph 13 (*Air Quality Management Plan*) and shall ensure the air quality management plan includes:

- 13.1.1 a plan identifying residential properties and other sensitive receptors that may be affected by the Works;
- 13.1.2 details of the dust limiting methods agreed by Project Co with the relevant local authorities;
- 13.1.3 details of Project Co's inspection regime and protocol for identifying, and remedying any system inadequacies or failings, and associated reporting;
- 13.1.4 details of Project Co's weather monitoring and weather influenced measures to be provided;
- 13.1.5 details of Project Co's proposals for auditing monitoring records and submission of resulting audit reports;
- 13.1.6 details of Project Co's procedures for conducting air pollution risk assessments; and
- 13.1.7 a table of air emission control measures that will be implemented by Project Co during the Works, together with clear guidance on implementation including roles and responsibilities,

(the "**Air Quality Management Plan**").

- 13.2 Project Co shall ensure that it demonstrates in the Air Quality Management Plan how it will ensure compliance with:
- 13.2.1 the Local Authorities' requirements under the Local Air Quality Management under part IV of the Environment Act 1995;
  - 13.2.2 the UK Air Quality Strategy 2000, as amended; and
  - 13.2.3 the Mayor's Air Quality Strategy.
- 13.3 Project Co shall ensure the Air Quality Management Plan reflects how Project Co will adhere to Good Industry Practice, including complying with:
- 13.3.1 CIRIA 'Environmental good practice on site' (C741); and
  - 13.3.2 CIRIA 'Compliance +' guidance.

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13.4 Project Co shall ensure all air pollution risk assessments shall be conducted before commencement of the relevant part of the construction of the Works and maintained at regular intervals throughout the Works.

13.5 Project Co shall identify within its Air Quality Management Plan the frequency of the risk assessments referred to in paragraph 13.4 and shall ensure that these risk assessments shall take into account all construction activities, construction techniques and materials and all potentially sensitive areas, including potentially sensitive areas outside the Project Land.

**14. Archaeological Written Scheme of Investigation**

14.1 Project Co shall produce an archaeological written scheme of investigation in accordance with the relevant requirements of the Transferred DCO Functions relating to the archaeological written scheme of investigation.

**15. Ecology Management Plan**

15.1 Project Co shall produce an ecology management plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the ecology management plan.

**16. Construction Materials Management Plan**

16.1 Project Co shall produce a construction materials management plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the construction materials management plan.

**17. Groundwater Monitoring and Verification Plan**

17.1 Project Co shall produce a groundwater monitoring and verification plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the groundwater monitoring and verification plan.

**18. Noise and Vibration Management Plan**

18.1 Project Co shall produce a noise and vibration management plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the noise and vibration management plan.

**19. Lighting Management Plan**

19.1 Project Co shall produce a lighting management plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the lighting management plan.

**20. Site Waste Management Plan**

20.1 Project Co shall produce a site waste management plan in accordance with the relevant requirements of the Transferred DCO Functions relating to the site waste management plan.

**21. Environmental Training Plan**

21.1 Project Co shall produce a project specific environmental training plan (the "**Environmental Training Plan**") in accordance with the requirements of this paragraph

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21 (*Environmental Training Plan*), which shall apply to all employees of Project Co and Sub-Contractors and all other Project Co Related Parties.

- 21.2 Project Co shall ensure that the primary objective of the Environmental Training Plan shall be to ensure that environmental protection is delivered by construction managers and site operatives.
- 21.3 Project Co shall ensure that the Environmental Training Plan shall include training in relation to added value environmental enhancement and material and energy resource management.

**22. Operation and Maintenance Environmental Management Plan**

- 22.1 Prior to the Permit to Use Date, Project Co shall produce the OMEMP, which shall be implemented for the duration of the Services and shall:
- 22.1.1 include all of the matters and comply with all of the requirements set out in this paragraph 22 (*Operation and Maintenance Environmental Management Plan*);
  - 22.1.2 be developed in accordance with and incorporate the requirements of Schedule 18 (*Operations and Maintenance Requirements*); and
  - 22.1.3 be based on the draft OMEMP included as Annex 3 (*Draft Project Co Operation and Maintenance Environmental Management Plan*).
- 22.2 Project Co shall ensure that the OMEMP is submitted as part of the Environmental Management System to TfL for review under the Review Procedure and shall throughout the Availability Period comply with the OMEMP endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure.
- 22.3 Project Co shall ensure a team with professionals of the appropriate skills, knowledge and experience is in place to implement the OMEMP.
- 22.4 Project Co shall ensure that the OMEMP includes:
- 22.4.1 an environmental management programme, which shall identify Project Co's:
    - a. objectives and targets relating to environmental improvements and the prevention or minimisation of environmental impacts;
    - b. actions to achieve objectives and targets, grouped into routine maintenance and environmental projects categories;
    - c. responsibilities and timeframes for implementation of routine maintenance and environmental projects;
    - d. status of implementation of routine maintenance and environmental projects; and
    - e. status of achievement of objectives and targets; and
  - 22.4.2 details of relevant environmental training to be provided for all Project Co Related Parties in relation to the Services, including training in relation to added value environmental enhancement and material and energy resource management.

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- 22.5 Project Co shall include a routine maintenance section in the OMEMP which shall include:
- 22.5.1 details of the actions to be carried out in the O&M Area routinely to ensure that environmental objectives and targets are achieved; and
  - 22.5.2 appropriate environmental management actions including those related to traffic, noise and vibration, air emissions, materials, Notifiable Environmental Incidents and ecology.
- 22.6 Examples of routine maintenance which Project Co shall include are:
- 22.6.1 amenity grass cutting;
  - 22.6.2 noxious/injurious weed treatment;
  - 22.6.3 footway clearance (back of footway and above); and
  - 22.6.4 hard standing/drains spraying.
- 22.7 Project Co shall include an environmental projects section in the OMEMP which shall include:
- 22.7.1 details of surveys and investigations it will undertake to identify or investigate environmental problems or potential environmental problems that may arise during the Availability Period, together with opportunities for environmental improvement in specific areas of the Project Facilities; and
  - 22.7.2 details of how it will use the results of these surveys and investigations to amend its routine maintenance requirements and to plan work, which shall consist of physical intervention aimed at addressing specific environmental problems or environmental improvement opportunities.
- 22.8 Project Co shall identify and undertake such work identified in the OMEMP referred to in paragraph 22.7.2.

**Annex 1 of Part 4 – Draft Environmental Management System**

**Commercially sensitive Information**

**Annex 2 of Part 4 – Draft Construction Environmental Management Plan**

**Commercially sensitive Information**

**Annex 3 of Part 4 – Draft Operation and Maintenance Environmental Management Plan**

**Commercially sensitive information**

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## **SCHEDULE 8**

### **MANAGEMENT SYSTEMS**

#### **Part 5 - Information Management**

##### **1. General requirements**

- 1.1 In accordance with the timing set out in the Mobilisation Plan, Project Co shall:
- 1.1.1 prepare and submit to TfL under the Review Procedure the Information Management System, which shall:
    - a. be based on and developed from the draft information management system set out in Annex 3 (*Project Co Information Management Proposals*);
    - b. provide for the management by Project Co of all information associated with the Works and Services in accordance with this Part 5 (*Information Management*); and
    - c. comply with:
      - i. ISO/IEC 27001;
      - ii. ISO/IEC 27002; and
      - iii. BS 10012; and
  - 1.1.2 ensure that TfL has endorsed such system as "received" or "received with comments" in accordance with the Review Procedure.
- 1.2 Project Co may propose updates to the Information Management System at any time (and, in any event, shall review the Information Management System not less than once every year) and shall submit any proposed updates to the Information Management System to TfL under the Review Procedure.
- 1.3 Project Co shall comply with the Information Management System which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure (including in accordance with paragraph 1.2) and perform its obligations under this Agreement in accordance with such Information Management System.
- 1.4 Project Co shall include as an addressee in any email communications between Project Co and TfL, the project email address provided to Project Co by TfL from time to time.
- 1.5 Project Co shall ensure all interfaces contained in the Information Management System provide efficient information transfer between all supporting sub-systems in order to minimise manual input and processing.
- 1.6 Project Co shall limit the number of sub-systems in the Information Management System to the absolute minimum needed to perform its obligations effectively and in accordance with this Agreement.

##### **2. Information governance**

- 2.1 In accordance with the timing set out in the Mobilisation Plan, Project Co shall:

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- 2.1.1 prepare and submit to TfL under the Review Procedure the Information Governance Strategy, which shall:
- a. be based on and developed from the draft information governance strategy set out in Annex 3 (*Project Co Information Management Proposals*); and
  - b. provide for the governance of all information associated with the Works and Services in accordance with this Part 5 (*Information Management*); and
- 2.1.2 ensure that TfL has endorsed such strategy as "received" or "received with comments" in accordance with the Review Procedure.
- 2.2 Project Co may propose updates to the Information Governance Strategy at any time (and, in any event, shall review the Information Governance Strategy not less than once every year) and shall submit any proposed updates to the Information Governance Strategy to TfL under the Review Procedure.
- 2.3 Project Co shall, and shall ensure that its Sub-Contractors shall, comply with the Information Governance Strategy which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure (including in accordance with paragraph 2.2) and Project Co shall perform its obligations under this Agreement in accordance with such Information Governance Strategy.
- 2.4 Project Co shall classify and treat all information in relation to the Project in accordance with the documents issued by TfL entitled "TfL Standard - Information Security Classification" and "Protecting TfL Information interactive grid" issued as at the Bid Date. Where information classified by "TfL Standard - Information Security Classification" as restricted is handled by Project Co or its Sub-Contractors, Project Co shall, and shall ensure that that its Sub-Contractors shall, inform TfL of the point of contact for information security for each of Project Co and the relevant Sub-Contractors (as applicable).
- 2.5 Project Co shall produce and implement an information assurance standard that sets out the framework to ensure the confidentiality, integrity and availability of its information by stating its requirements on people and behaviours, physical protection of information and requirements for information technology systems and equipment.
- 2.6 To the extent that TfL provides access to any persons working on Project Co's behalf to TfL systems or networks, Project Co acknowledges that such person must agree to TfL's third party acceptable use policy before such access is granted. Where such access is provided, Project Co shall, and shall procure that any relevant Sub-Contractors shall, enter into a code of connection agreement in the form provided by TfL.

**3. Information Security Requirements**

- 3.1 In accordance with the timing set out in the Mobilisation Plan, Project Co shall:
- 3.1.1 prepare and submit to TfL under the Review Procedure the Information Security Strategy, which shall:
- a. be based on and developed from the draft information security strategy set out in Annex 3 (*Project Co Information Management Proposals*); and

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- b. provide for the security of all information associated with the Works and Services in accordance with this Part 5 (*Information Management*); and
- 3.1.2 ensure that TfL has endorsed such strategy as "received" or "received with comments" in accordance with the Review Procedure.
- 3.2 Project Co may propose updates to the Information Security Strategy at any time (and, in any event, shall review the Information Security Strategy not less than once every year) and shall submit any proposed updates to the Information Security Strategy to TfL under the Review Procedure.
- 3.3 Project Co shall, and shall ensure that its Sub-Contractors shall, comply with the Information Security Strategy which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure (including in accordance with paragraph 3.2) and Project Co shall perform its obligations under this Agreement in accordance with such Information Security Strategy.
- 3.4 Project Co shall comply with the requirements set out in Annex 2 (*Information Security*).
- 4. Intellectual Property Rights and Use of Models**
- 4.1 Intellectual Property Rights shall be dealt with in accordance with clause 41 (*Intellectual Property*).
- 4.2 Project Co shall, and shall ensure that its Sub-Contractors shall, comply with the TfL Building Information Modelling (BIM) Protocol.
- 4.3 In accordance with the timing set out in the Mobilisation Plan, Project Co shall:
  - 4.3.1 prepare and submit to TfL under the Review Procedure the Model Production and Delivery Table, which shall:
    - a. be based on and developed from the draft model production and delivery table set out in Annex 3 (*Project Co Information Management Proposals*); and
    - b. provide for the model production and delivery requirements associated with the Works and Services in accordance with this Part 5 (*Information Management*); and
  - 4.3.2 ensure that TfL has endorsed such table as "received" or "received with comments" in accordance with the Review Procedure.
- 4.4 Project Co may propose updates to the Model Production and Delivery Table at any time (and, in any event, shall review the Model Production and Delivery Table not less than once every year) and shall submit any proposed updates to the Model Production and Delivery Table to TfL under the Review Procedure.
- 4.5 Project Co shall:
  - 4.5.1 produce and deliver each model specified in the Model Production and Delivery Table to the level of detail and at the stage specified in the Model Production and Delivery Table and in accordance with this Part 5 (*Information Management*); and

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- 4.5.2 arrange for the requirements set out in this Part 5 (Information Management) to be incorporated into any Sub-Contracts to the extent required to enable it to comply with the standards and information management requirements defined within this Part 5 (*Information Management*).

**5. Information Exchange Requirements**

- 5.1 Project Co shall comply with the Information Delivery Plan, and shall set out in BIM Execution Plan required pursuant to paragraph 8 (*BIM Execution Plan Requirements*) how it shall comply with the Information Delivery Plan.
- 5.2 Project Co shall provide the Key Information to TfL at each Key Information Exchange Point.
- 5.3 Project Co shall set out within the BIM Execution Plan required pursuant to paragraph 8 (*BIM Execution Plan Requirements*) the timing and content of information exchanges between Project Co and its Sub-Contractors, and how these will allow Project Co to comply with its obligations under paragraph 5.2.
- 5.4 The Key Information shall be delivered in the following formats:
- 5.4.1 2D & 3D model files – in their native discipline (un-federated) file format and in open standard IFC format and in the case of federated files, in native and published (nwd) format;
- 5.4.2 Drawings – cut from models in PDF and native file format;
- 5.4.3 Structured data – manual input or from information models, in BS1192-4 format, all exchanged as files and reference in the COBie transmittal sheet, to be issued in both IFC and XLS format to suit TfL asset management systems; and
- 5.4.4 Native and PDF documents (reports, schedules).
- 5.5 The requirements in this paragraph 5 (*Information Exchange Requirements*) are without prejudice to any other requirements of this Agreement.

**6. Information Management Roles and Responsibilities**

- 6.1 Project Co shall set out within the BIM Execution Plan required pursuant to paragraph 8 (*BIM Execution Plan Requirements*) the information modelling and management roles in accordance with PAS1192 parts 2, 3, 5 and 6, including the role of Project Co's information manager.
- 6.2 Project Co shall set out within the BIM Execution Plan required pursuant to paragraph 8 (*BIM Execution Plan Requirements*) the persons responsible for information modelling and management and shall describe the activities performed by, and the authorities held by, each such person.
- 6.3 TfL information modelling and management roles are as follows:
- 6.3.1 TfL information manager;
- 6.3.2 TfL project manager;

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- 6.3.3 TfL built asset security manager;
- 6.3.4 TfL asset management manager; and
- 6.3.5 TfL health and safety manager.

**7. Collaborative Working**

- 7.1 Project Co shall procure and manage a Project Co common data environment (the "**Project Co CDE**") to facilitate collaborative working and information exchange between Project Co and its Sub-Contractors in respect of information relating to the Works and the Services (including Design Data) which Project Co is required to submit to TfL under this Agreement.
- 7.2 Project Co shall set out within the BIM Execution Plan required pursuant to paragraph 8 (*BIM Execution Plan Requirements*) details of:
  - 7.2.1 frequency and format of project milestone information exchanges;
  - 7.2.2 proposals to manage restrictions around sharing of data and information in accordance with security requirements defined herein;
  - 7.2.3 how the requirements of the Information Delivery Plan will be met and monitored;
  - 7.2.4 details of the design review process, enabled through collaborative working practices; and
  - 7.2.5 frequency and methods for design reviews using federated model/data;
  - 7.2.6 Project Co's proposed collaboration tool and how it will operate in support of the Project Co CDE in accordance with PAS 1192-2:2013 and BS 1192:2007 + A2:2016; and
  - 7.2.7 how information and deliverables will be shared and published to TfL's CDE,which in each case shall comply with this Part 5 (*Information Management*).

**8. BIM Execution Plan Requirements**

- 8.1 In accordance with the timing set out in the Mobilisation Plan, Project Co shall:
  - 8.1.1 prepare and submit to TfL under the Review Procedure the BIM Execution Plan, which shall:
    - a. be based on and developed from the draft BIM execution plan set out in Annex 3 (*Project Co Information Management Proposals*);
    - b. provide for the information requirements associated with the Works and Services in accordance with this Part 5 (*Information Management*); and
  - 8.1.2 ensure that TfL has endorsed such plan as "received" or "received with comments" in accordance with the Review Procedure.

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- 8.2 Project Co may propose updates to the BIM Execution Plan at any time (and, in any event, shall review the BIM Execution Plan not less than once every six months) and shall submit any proposed updates to the BIM Execution Plan to TfL under the Review Procedure.
- 8.3 Project Co shall comply with the BIM Execution Plan which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure (including in accordance with paragraph 8.2) and perform its obligations under this Agreement in accordance with such BIM Execution Plan.
- 8.4 Project Co shall:
- 8.4.1 comply with Annex 1 (*TfL Information Requirements*); and
  - 8.4.2 ensure all Design Data complies with the requirements of BIM Level 2, enshrined in the "Government Construction Strategy", including fully collaborative 3D BIM (as defined therein).
- 8.5 In carrying out its obligations under this Agreement, Project Co shall not carry out any action or permit any inaction which is contrary to the guidance set out for BIM Level 3 and in accordance with "Digital Built Britain".
- 8.6 Project Co shall monitor, review and feedback to TfL, at quarterly intervals between the Effective Date and prior to the Permit to Use Date and at annual intervals during the Availability Period, both qualitative and quantitative assessments, where the processes and workflows set out in the BIM Execution Plan have directly resulted in:
- 8.6.1 health, safety and welfare improvements;
  - 8.6.2 programme and cost efficiencies;
  - 8.6.3 quality improvements; and
  - 8.6.4 environmental improvements including reduced carbon expenditure.
- 9. Health & Safety/Construction Design Management (H&S/CDM)**
- 9.1 Project Co shall set out in the BIM Execution Plan, how its obligations under the Health and Safety Regime, the CDM Regulations and Part 3 (*Health and Safety Management System*), will be supported through the implementation of building information modelling and digital technologies.
- 9.2 Project Co shall ensure that the BIM Execution Plan includes details of Project Co's processes for managing health and safety and construction design management information in a building information modelling environment in accordance with PAS 1192-6 (*Specification for collaborative sharing and use of structured Health and Safety information using BIM*), including to:
- 9.2.1 determine roles and responsibilities for health and safety and construction design management, including the role of "Principal Designer" for the purposes of the CDM Regulations and how identified roles interface with information management;

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- 9.2.2 establish a robust, structured and managed digital system to record health and safety information throughout the project lifecycle that ensures the relevant health and safety information is available to the relevant people, at the relevant time and for the relevant purpose;
- 9.2.3 determine the health and safety and construction design management deliverables for each stage of the Project and confirm how these deliverables will be made available through a common data environment;<sup>2</sup>
- 9.2.4 populate relevant and structured health and safety information models of the Project and built asset using consistent information exchange formats;
- 9.2.5 ensure that health and safety information is managed and protected in accordance with the security requirements and policies established for each stage of the Project; and
- 9.2.6 determine how health and safety risk management information is used in a digital form to support planning, design reviews, training, health and safety inductions and risk assessments.

**10. Asset Information Requirements**

- 10.1 In accordance with the timing set out in the Mobilisation Plan, Project Co shall:
  - 10.1.1 prepare and submit to TfL under the Review Procedure the Asset Information Management Process, which shall:
    - a. be based on and developed from the draft asset information management process set out in Annex 3 (*Project Co Information Management Proposals*); and
    - b. provide for the governance of all information associated with the Works and Services in accordance with this Part 5 (*Information Management*); and
  - 10.1.2 ensure that TfL has endorsed such process as "received" or "received with comments" in accordance with the Review Procedure.
- 10.2 Project Co may propose updates to the Asset Information Management Process at any time (and, in any event, shall review the Asset Information Management Process not less than once every year) and shall submit any proposed updates to the Asset Information Management Process to TfL under the Review Procedure.
- 10.3 Project Co shall comply with the Asset Information Management Process which is endorsed as "received" or "received with comments" by TfL pursuant to the Review Procedure (including in accordance with paragraph 10.2) and perform its obligations under this Agreement in accordance with such Asset Information Management Process.
- 10.4 Project Co shall establish, document, implement and maintain the Asset Information Management Process in compliance with "*PAS 1192-3:2014 Specification for information management for the operational phase of assets using building information modelling*".

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<sup>2</sup> Note to Tenderers: for guidance, Tenderers' attention is drawn to the document entitled "*TfL Guidance on H&S requirements at each project stage*" in the Data Room.

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- 10.5 Project Co shall ensure that the Asset Information Management Process covers the operational life of the asset, including:
- 10.5.1 the Handover Requirements;
  - 10.5.2 day-to-day operation of the asset;
  - 10.5.3 planned and reactive maintenance;
  - 10.5.4 minor works;
  - 10.5.5 major works;
  - 10.5.6 decommissioning;
  - 10.5.7 dismantling and/or demolition; and
  - 10.5.8 the handback requirements of Schedule 19 (*Handback Requirements*).
- 10.6 Project Co shall ensure that the Asset Information Management Process takes into account:
- 10.6.1 the asset management requirements set out in Schedule 10 (*Design and Construction Requirements*) and Schedule 18 (*Operation and Maintenance Requirements*); and
  - 10.6.2 the requirements set out in the Asset Management System Information Requirements.
- 10.7 Project Co shall develop the Asset Information Management Process to include the following key steps:
- 10.7.1 establish information governance processes to direct, control and assure that asset information is managed effectively as an organisational resource, with reference to any asset management strategies and plans;
  - 10.7.2 establish how Project Co shall comply with the TfL Organisational Information Requirements (OIR);
  - 10.7.3 set out the "Asset Information Requirements (AIR)", (as defined in PAS1192:3), that shall be met in order that the "Organisational Information Requirements" can be satisfied, and the information exchanges by which data and information is transferred to and from the "Asset Information Model (AIM)" (as defined in PAS1192:3);
  - 10.7.4 define the mechanisms for creating, receiving, validating/verifying, storing, sharing, archiving, analysing and reporting on the information and data to be held in the Asset Information Model;
  - 10.7.5 define the interfaces for exchange of data and information between the Asset Information Model and other asset information systems used by TfL referred to in paragraph 10.8; and

10.7.6 define the mechanisms for maintaining the Asset Information Model and for monitoring the quality, including referential integrity, of data and information within the Asset Information Model through the use of the CDE.

10.8 The following table provides details of TfL's current corporate solutions for the management of asset information and vehicle for delivery of the required information.

Asset Information		
System	Data / Information	Delivery Vehicle
NAMMS, BridgeStation, Asset Data Warehouse, CONFIRM, Site Fault Management (SFM), Strategic Asset Management System (SAMS), Maximo, Ellipse, TunnelStation	Non-Graphical Data	Asset Data Collection Templates

**11. Delivery Strategy for Asset Information**

11.1 Project Co shall comply with the Information Delivery Plan when it provides information (as published and contained in the published information exchange COBie file together with associated exchange information files) to the Asset Information Model (AIM).

11.2 Where practicable, the asset hierarchy and attribution shall utilise industry AD4/IADD4UK schemas with an aim to create a complete asset data dictionary that will deliver the details needed to populate COBie for the 'Concept', 'Design', 'Construction' and 'Maintenance' data drops.

11.3 Where practicable, COBie-UK-2012 BS 1192-4 excel sheet data structure shall be used as the default exchange format for non-graphical information whether 3D modelling is involved or otherwise. The following COBie-UK-2012 tabs to be completed as a minimum:

- 11.3.1 'Facility' named location of the project;
- 11.3.2 'Contacts' for full project directory/contact sheet;
- 11.3.3 'Components' and 'Systems' for the project asset schedule;
- 11.3.4 'Documents' for packages of information issued, including 3D models, 2D data, data tables, schedules and operations and maintenance guidance; and
- 11.3.5 'Impact' recording TfL soft landing requirements at data exchange points.

11.4 Project Co shall deliver asset information in accordance with BS1192-4:2014 and PAS 1192-5:2015. Project Co shall ensure the integrity of data included in the COBie schema as follows:

- 11.4.1 every 'Component' should be assigned to at least one 'Space';
- 11.4.2 every 'Component' should be assigned to at least one 'Type';
- 11.4.3 every 'Component' should be assigned to at least one 'System';
- 11.4.4 every 'Space' should be assigned at least one 'Zone';
- 11.4.5 every reference to other sheets should be valid;

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11.4.6 every reference to 'Pick List' enumerations and classifications should be valid; and

11.4.7 enumerations specified in the 'Attributes and Pick Lists' should be adhered to.

**12. Standards & Specifications**

12.1 In carrying out its obligations under this Part 5 (*Information Management*), Project Co shall comply with the following standards and specifications in the form as at the Bid Date:

12.1.1 BS 1192:2007 + A2:2016 (collaborative production of architectural, engineering and construction information, code of practice);

12.1.2 PAS 1192-2:2013 (specification for information management for the capital/delivery phase of construction projects using building information modelling);

12.1.3 PAS 1192-3:2014 (specification for information management for the operational phase of assets using building information modelling);

12.1.4 PAS 1192-5:2015 (specification for security-minded building information modelling, digital built environments and smart asset management);

12.1.5 PAS 1192-6 (specification for collaborative sharing and use of structured health and safety information using building information modelling);

12.1.6 BS 1192-4:2014 (collaborative production of information, fulfilling employer's information exchange requirements using COBie, code of practice);

12.1.7 BS 8536-1:2015 (briefing for design and construction, code of practice for facilities management (building infrastructure));

12.1.8 BS 8536-2:2016 (briefing for design and construction, code of practice for asset management (linear and geographical infrastructure));

12.1.9 Lord Chancellor's Code of Practice on Records Management;

12.1.10 International Standard ISO15489:2001 (International Standard on Records Management);

12.1.11 International Standard ISO 27001 (Information Security Management Systems);

12.1.12 International Standard ISO 27002;

12.1.13 BSI 10008:2008 Legal admissibility and evidential weight of information stored electronically; and

12.1.14 The National Archives' standards on electronic records management.

**13. Training**

- 13.1 Project Co shall include in the BIM Execution Plan the training that it will provide across the project stakeholders, supply chain and TfL for their tools and systems expected to be used which shall include Project Co's collaboration tools.

**14. Definitions**

- 14.1 For the purposes of this Part 5 (*Information Management*), the following words and expressions shall have the following meanings:

**"Asset Management System Information Requirements"** means the document titled 'Asset Management System Information Requirements, Version 1.0' dated March 2018;

**"Information Delivery Plan"** means the document titled 'Silvertown Tunnel - Information Delivery Plan, Version 1.0' dated November 2017, which sets out the minimum information deliverables required by TfL for each stage of the Project;

**"Key Information"** means, in respect of each Key Information Exchange Point, the information specified in the Information Delivery Plan;

**"Key Information Exchange Point"** means each key information exchange point specified in the TfL Key Information Exchanges Document;

**"TfL Building Information Modelling (BIM) Protocol"** means the document titled 'Silvertown Tunnel Project Building Information Modelling (BIM) Protocol, Version 1.0' dated November 2017;

**"TfL Key Information Exchanges Document"** means the document titled 'Silvertown Tunnel TfL Information Exchanges Document, Version 1.0' dated November 2017; and

**"TfL Organisational Information Requirements (OIR)"** means the document titled 'TfL Organisational Information Requirements (OIR), Version 1.0' dated November 2017.



**Annex 1 of Part 5 – Tfl Information Requirements**

**1. Technical Requirements**

**1.1 Data Exchange Formats**

1.1.1 All information relating to the Works and the Services (including Design Data) which Project Co is required to submit to Tfl under this Agreement must be submitted by Project Co to Tfl's common data environment as specified in paragraph 1.2 (the "Tfl CDE") in the relevant file format(s) as set out in Table A1.1 (*Tfl's Data Exchange Format*).

**Table A1.1 Tfl's Data Exchange File Formats**

Data/Information		Exchange Format	File	Version
Non-graphical data		Native files XLS DOC PDF SHP Cobie-UK-2012		N/A 2010 2010 11 N/A BS1192-4 compliant
Graphical data (models and drawings)		Native files DWG RVT IFC NWC NWD PDF 3D PDF ESRI		N/A 2015 2015 IFC4 2015 2015 11 TBA
4D simulation	Graphical data	Native files DWG RVT NWC NWD		N/A 2015 2015 2015 2015
	Non-graphical data	Native files XLS		N/A 2010
5D cost data (non-graphical data)		Native files XLS		N/A 2010
Programmes (Primavera)		Native files XER PDF		N/A 2016 11
Data capture	Graphical data / surveys (3D Point Clouds)	Native files Autodesk Recap		N/A 2015

1.1.2 Project Co shall ensure that the BIM Execution Plan includes details of:

- (a) how Project Co will meet the file exchange formats set out in Table A1.1 (*Tfl's Data Exchange Formats*); and

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(b) how Project Co will address and manage interoperability issues.

1.2 Tfl's CDE for information received from Project Co is Asite Adoddle.

1.3 Data Classification, Metadata and File Attributes

1.3.1 Project Co shall ensure that all information relating to the Works and the Services (including Design Data) which Project Co is required to submit to Tfl, under this Agreement, where relevant:

- (a) utilises classifications in accordance with paragraph 1.3.2;
- (b) carries metadata in accordance with paragraph 1.3.3; and
- (c) carries attribute data, in accordance with paragraph 1.3.4.

1.3.2 Classifications

Project Co shall assign classifications to all graphical information relating to the Works and the Services (including Design Data) which Project Co is required to submit to Tfl under this Agreement in accordance with Tfl Uniclass 2015 Tables as referred to in Table A2.1 (*Standards*). For the purposes of classification, Project Co shall use the tables identified in Table A1.2 (*Classifications*).

**Table A1.2 Classifications**

Table	Description
Complexes	Collection of the entities that forms the overall project environment.
Entities	Discrete individual assets (such as a bridge, tunnel, road).
Spaces/Locations	Spaces are named locations for activities such as use, inspection or maintenance, including un-occupied or un-inhabitable spaces. Infrastructure spaces include transport corridors that run between two locations.
Elements	The individual components that forms the entity (such as bridge piers, bridge decks).
Systems	Collection of sub-components that go together to form the element (such as bridge expansion joint systems, unit paving systems).
Products	Individual items that are used to construct a system.

1.3.3 Metadata

(a) Project Co shall ensure that all information relating to the Works and the Services (including Design Data) which Project Co is required to submit to Tfl under this Agreement carries metadata in individual fields within the CDE as set out in Table A1.3 (*Mandatory Metadata*).

**Table A1.3 Mandatory Metadata**

Field	Description	Code
Unique file identification (File ID)	Used to uniquely identify a file. Concatenation of the metadata fields as set out in Appendix A.	Refer to Appendix A
Suitability status	Used to indicate the approved use of the content of the relevant information.	Refer to Appendix A
Revision	Used to indicate the issue sequence of the relevant information.	Refer to Appendix A
Title	Used to identify the content of the relevant information.	N/A
Created (author)	Used to identify the individual author at each revision of the relevant information.	Initial.Surname
Approved	Used to identify the individual approver of each revision of the relevant information.	Initial.Surname
Authorised	Used to identify the individual authoriser of each revision of the relevant information.	Initial.Surname
Grid reference system	Determines the grid system the content of the relevant information has been coordinated to (i.e. OS Grid (OSG)) or if the content is non-spatial data/information (NON).	XXX (i.e. OSG/NON)
Location (geographically searchable)	OS National Grid six figure tile reference.	TQXXXXXX (e.g. TQ415795)
Project coordinates	Determines the coordinates of the project boundary (classified as a Complex in accordance with the Uniclass 2015 classification system).	XYZ
Security classification	Used to indicate the integrity, availability and confidentiality of the data/information.	Refer to the TfL Standard – Information Security Classification
Life-cycle stage	Used to identify the stage in the assets' life-cycle at which the contained information has been approved for use.	e.g. Concept Design
Pathway Project Code	Unique code used to identify the Project within TfL.	To be provided by TfL, e.g. UIP9999

- (b) Project Co shall ensure that the component fields of the unique file identification are provided in individual metadata fields within the CDE.

#### 1.3.4 Attribute Data

Project Co shall ensure that all objects within the models listed in the Model Production and Delivery Table shall carry, as a minimum, the attribute fields as identified in Table A1.4 (*Minimum Attribute Data*).

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**Table A1.4 Minimum Attribute Data**

Attribute Field	Description
Name	Identifies the name of the system and/or Component. Example: FP5 Circuit.
Description	Brief description of the system and/or component. Example: Single Phase Feeder Pillar FP5 East Hill.
Classification	TfL Uniclass 2015 (see Table A2.1 ( <i>Standards</i> )) Example: Ss_70_80_25_70 Roadway Lighting Systems.
Actual Cost	Quantified cost of system.
Maintenance Cost	Estimated maintenance cost of system.

#### 1.4 Co-ordinates

- 1.4.1 Project Co shall ensure that all information relating to the Works and the Services (including Design Data) that has a geographical element which Project Co is required to submit to TfL under this Agreement shall use Ordnance Survey of Great Britain references for horizontal coordinates and Ordnance Datum Newlyn references for vertical heightings.
- 1.4.2 Project Co shall ensure that details are provided in the BIM Execution Plan of:
- (a) dimensional accuracies and precisions;
  - (b) absolute and relative positional accuracies and precisions; and
  - (c) construction tolerances which shall be allowed for in the updating of the design models for the as-constructed models.

#### 1.5 Information Stages

- 1.5.1 Project Co shall ensure that all information relating to the Works and the Services (including Design Data) which Project Co is required to submit to TfL under this Agreement is provided to the level of detail or level of information (as applicable) set out in Table A1.5 (*Levels of Definition*), at each relevant stage of the Project, in accordance with paragraph 1.5.2 to paragraph 1.5.5.
- 1.5.2 Project Co shall ensure that any concept designs produced by Project Co when performing the Works and Services is produced to the level of detail or level of information (as applicable) indicated in the row entitled "Stage 3 – Concept Design" in Table A1.5 (*Levels of Definition*).
- 1.5.3 Project Co shall ensure that any graphical or non-graphical data submitted to TfL, prior to the issue of a Design Certificate pursuant to Schedule 9 (*Certification and Review Procedure*) in respect of the relevant data, is submitted to the level of detail or level of information (as applicable) indicated in the row entitled "Stage 4 – Detailed Design" in Table A1.5 (*Levels of Definition*).

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- 1.5.4 Project Co shall ensure that any graphical or non-graphical data submitted to TfL, following the issue of a Design Certificate but prior to the issue of a Construction Certificate pursuant to Schedule 9 (*Certification and Review Procedure*) in respect of the relevant data, is submitted to the level of detail or level of information (as applicable) indicated in the row entitled "Stage 5 – Delivery" in Table A1.5 (*Levels of Definition*).
- 1.5.5 Where Project Co is required to submit to TfL any as-built data in accordance with this Agreement and/or whenever paragraph 10 (*Asset Information Requirements*) of Part 5 (*Information Requirements*) of Schedule 8 (*Management Systems*) applies, Project Co shall ensure that the relevant data is submitted to the level of detail or level of information (as applicable) indicated in the row entitled "Stage 6 – Project Close" in Table A1.5 (*Levels of Definition*).

**Table A1.5 Levels of Definition**

TfL Pathway Stage	Level of Detail - Graphical Data	Level of Information - Non-Graphical Data	Use
Stage 3 - Concept Design	Task/discipline team specific model files. Discipline team allocated volumes. Architectural form and space arrangement (including that reserved for ME&P). Outline structural/civil spatial arrangements. Space allocation for generic systems, assets or assemblies - approximate size, shape, location and orientation. Space allocation to include physical, operational, installation and replace space. Relationship and interfaces between systems, sub-systems, equipment and components, between different asset areas and those with other parties.	Identification of the systems, sub-systems and equipment. Identification of the function of the systems, sub-systems and equipment. General performance criteria (based on assumed asset/system types).	Freeze scope. Coordination (based on size, location and clearance to other elements), including buildability and maintainability. Specific performance criteria. Analysis (by application of generalised performance criteria), used to decide final form, equipment and overall construction.
Stage 4 - Detailed Design	Graphically represented as a specific system, asset or assembly in terms of quantity, size, shape, location and orientation. Primary elements developed and	Actual performance criteria.	Procurement. Specific coordination based on form, size, location, and clearance to other elements, including operational and maintenance

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	frozen.		spaces. Extraction of construction documents. Analysis (by application of actual performance criteria), Coordination based on size, location, and clearance to other elements, including fabrication, installation and details operation issues. Selection of a manufacturer's product. Fabrication and assembly.
Stage 5 - Delivery	Graphically represented as actual specific manufacturer's system, asset or assembly in terms of quantity, size, shape, location and orientation. All elements developed and frozen.		Performance (measure from installed systems) Operation and maintenance costs (measure from installed systems).
Stage 6 - Project Close	Graphically represented as actual built/constructed/installed manufacturer's system, asset or assembly in terms of quantity, size, shape, location and orientation.	All attributes required to populate Asset Management Systems.	Reconcile asset information model (AIM). Maintenance schedule (derived from installed system). Asset management activities.

1.5.6 Project Co shall provide details of the varying levels of detail to be used for all information relating to the Works and the Services (including Design Data) which Project Co is required to submit to TfL under this Agreement at each stage of the Project in the geometric level of detail schedule, which forms part of the BIM Execution Plan, and Project Co shall refer to such details in the Model Production and Delivery Table.

1.5.7 Project Co shall ensure that the levels of definition it provides comprise the following:

- (a) in relation to graphical data, the level of detail to which the physical characteristics, of the asset(s), are represented (as graphical data) within model files, at each stage of the Project; and
- (b) in relation to non-graphical data, the type and amount of information (about the assets' functional characteristics) which may be included as attributes (non-graphical data) associated with the model files and associated with the objects contained within the model files, at each stage of the Project.

1.5.8 For information purposes only, Table A1.6 shows how TfL's "Pathway" stages align with the "Construction Industry Council (CIC) Scope of Services" stages.

**Table A1.6 Alignment of Stages**

<b>CIC Scope of Services Stages</b>	<b>Pathway Stages</b>
Stage 2 - Concept	Stage 3 - Concept Design
Stage 3 - Design	
Stage 4 - Definition	Stage 4 - Detailed Design
Stage 5 - Build & Commission	Stage 5(a) - Delivery
Stage 6(a) - Handover & Closeout	Stage 6(a) - Project Close
Stage 7 - Operation	Stage 5(b) - Delivery
Stage 6(b) - Handover & Closeout	Stage 6(b) - Project Close

**2. Management Requirements**

2.1 TfL's BIM Strategic Objectives

2.1.1 Project Co shall produce and manage all information relating to the Works and the Services (including Design Data) which Project Co is required to submit to TfL under this Agreement, in accordance with, as a minimum, TfL's building information modelling strategic objectives and vision as set out in the TfL BIM Strategy set out in Table A2.1 (*Standards*), which includes:

- (a) delivery of verified, structured information and data to support Project gateway decisions, including project documents, information models, reports and appraisals;
- (b) delivering information to TfL that meets the operational performance requirements for information management as set out within the TfL Organisational Information Requirements (OIR) document;
- (c) improved engagement across Project stakeholders;
- (d) building the project information into the Asset Information Model;
- (e) driving safe systems of working and security within a building information modelling environment;
- (f) linking and/or passing information to operational and line of business systems that will support strategic, operational asset management decision-making and streamlining following the practical completion and construction of works and installations; and
- (g) upskilling the supply chain on TfL's approach to and requirements for building information modelling.

2.2 Standards

2.2.1 In addition to the standards and specifications set out in Part 5 (*Information Management*) of Schedule 8 (*Management System*), Project Co shall produce

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and manage information relating to the Works and the Services (including Design Data) which Project Co is required to submit to TfL under this Agreement in accordance with the standards set out in Table A2.1 (*Standards*), where relevant.

**Table A2.1 Standards**

Standard Ref	Title
<b>TfL</b>	
N/A	TfL BIM Strategy
TFLCORE-RSM-XXX-XX-SP-ZZ-0001 (P2.1)	TfL Surface Road Space Management CAD Standards
S1782	TfL Standard - Information Security Classification
N/A	TfL Standard – Cyber Security Management Schedule
<b>Industry Standards</b>	
BS 1192-4:2014	Collaborative production of information – Part 4: Fulfilling employers information exchange requirements using COBie – Code of practice
BS8541-1:2012	Library objects for architecture, engineering and construction Part 1: Identification and classification – Code of practice.
BS8541-2:2011	Library objects for architecture, engineering and construction – Part 2: Recommended 2D symbols of building elements for use in building information modelling.
BS8541-3:2012	Library objects for architecture, engineering and construction – Part 3: Shape and measurement – Code of practice.
BS8541-4:2012	Library objects for architecture, engineering and construction – Part 4: Attributes for specification and assessment – Code of practice.
BS8541-5:2015	Assemblies – Code of Practice
BS7000-4:2013	Design management systems. Guide to managing design in construction.
BS8536-2:2016	Code of Practice for asset management (Linear and Geographical Infrastructure)
BS80000-1:2013	Quantities and units

### 2.3 Model Production and Delivery Table

2.3.1 Project Co shall ensure that the Model Production and Delivery Table contains:

- (a) the subject matter of each model;
- (b) the discipline (as specified in Table AA2.5 (*Discipline*) in Appendix A (*File Naming Convention*)) that is to produce and deliver each model at each stage; and
- (c) the level of detail and/or level of information (as applicable) for each model that will be submitted at each stage of the Project.

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- 2.3.2 Project Co shall ensure that the Model Production and Delivery Table indicates when each model will be delivered to TfL and clearly states to which element of the Project the relevant model relates, including but not limited to the:
- (a) Project Facilities;
  - (b) Additional Assets; and
  - (c) Supplementary Works.
- 2.3.3 Project Co shall ensure that the BIM Execution Plan includes details of how the models referred to in the Model Production and Delivery Table will be updated over time and how the physical interfaces will be represented and managed between the models.
- 2.4 Master Information Delivery Plan
- 2.4.1 Project Co shall capture all data and information deliverables within a master information delivery plan, as referred to in PAS 1192-2.
- 2.4.2 Project Co shall base the master information delivery plan on the Information Delivery Plan.
- 2.4.3 Project Co shall ensure that the Programme referred to in Schedule 2 (*Programme*) integrates the master information delivery plan referred to in paragraph 2.4.1, clearly identifying the title of data and information deliverables and its file reference number.
- 2.4.4 Project Co shall ensure that the Review Submission Schedule referred to in Schedule 9 (*Certification and Review Procedure*) is integrated into the master information delivery plan referred to in paragraph 2.4.1.
- 2.5 Massing and Volume Strategy
- 2.5.1 Project Co shall provide details within the BIM Execution Plan of its massing strategy, which shall establish the extents of the proposed design, including:
- (a) shape;
  - (b) general size;
  - (c) location; and
  - (d) orientation.
- 2.5.2 Project Co shall provide details within the BIM Execution Plan of its volume strategy which shall establish how the extent of the massing strategy is sub-divided into spaces and within which teams designs will be coordinated.
- 2.5.3 Project Co shall provide details within the BIM Execution Plan of its processes for utilising the massing and volume strategy, in accordance with PAS 1192-2:2013, to:
- (a) federate models;

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- (b) provide assurances and evidence of coordination of design teams within each volume; and
- (c) provide assurances and evidence of the coordination and integration between the volumes.

2.6 Model Federation and Modelling Strategy

2.6.1 Project Co shall federate its models at the appropriate stages as identified in the Model Production and Delivery Table.

2.6.2 Project Co shall provide details within the BIM Execution Plan of its modelling strategy, which shall include how all information relating to the Works and the Services (including Design Data) which Project Co is required to submit to TfL under this Agreement will be developed to enable:

- (a) collaborative working within teams;
- (b) coordination within (and across) teams;
- (c) efficient exchange through the CDE; and
- (d) delivery of graphical and non-graphical data in accordance with the requirements set out in Table A1.5 (*Levels of Definition*).

2.6.3 Project Co shall ensure each individual discipline model file does not exceed 100MB when complete and fully loaded with the required data. If the need to exceed the model file limit arises, Project Co shall seek approval from TfL.

2.7 Coordination and Clash Detection

2.7.1 Project Co shall set out its coordination and clash avoidance processes in the BIM Execution Plan, with reference to:

- (a) its massing and volume strategies;
- (b) dimensional and positional precisions and accuracies and tolerances;
- (c) technical query workflows;
- (d) clash resolution;
- (e) responsibilities for coordination and clash avoidance;
- (f) software to support coordination and clash avoidance; and
- (g) outputs from coordination and clash avoidance processes.

2.8 Systems Performance and Constraints

2.8.1 Project Co shall provide details within the BIM Execution Plan of any limitations or restrictions of its, or any of its supply chains', information technology systems, including as a minimum its limitations on file size and restrictions on use of versions of software.

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2.8.2 Project Co shall comply with any limitations or restrictions on Tfl's information technology systems. Project Co acknowledges that limitations include connectivity constraints, including firewall protocols and file type restrictions.

## 2.9 Compliance Plan

2.9.1 Project Co shall provide details within the BIM Execution Plan of how it will ensure that all information relating to the Works and the Services (including Design Data) which Project Co is required to submit to Tfl under this Agreement is:

- (a) verified against the requirements of Part 5 (*Information Management*) of Schedule 8 (*Management Systems*);
- (b) compliant with the relevant standards listed in of paragraph 12 (*Standards & Specifications*) of Part 5 (*Information Management*) of Schedule 8 (*Management Systems*) and Table A2.1 (*Standards*) of this Annex 1 (*Tfl Information Requirements*);
- (c) progressed to the agreed level of detail and/or level of information (as applicable) as set out in the Model Production and Delivery Table and is in accordance with the BIM Execution Plan;
- (d) spatially coordinated in relation to assets' physical space, operational space and maintenance space;
- (e) useable by the software platforms identified in this Annex 1 (*Tfl Information Requirements*);
- (f) in the formats identified in this Annex 1 (*Tfl Information Requirements*); and
- (g) checked and approved for technical content prior to submission to Tfl pursuant to the Review Procedure.

## 2.10 Supply Chain Assessment

2.10.1 Project Co shall provide details within the BIM Execution Plan of its process for supply chain assessment to address changes to its supply chain and/or its building information modelling capability.

## 2.11 Transmittals

2.11.1 Project Co shall accompany all formal issuing of data and information to Tfl pursuant to this Agreement with an electronic transmittal in the form of a notification, which Project Co shall generate within Tfl's CDE.

**APPENDIX 1 FILE NAMING CONVENTION**

**Introduction**

A1.1 This file naming convention applies to all information submitted to TfL via the CDE.

**File Naming**

A1.2 File Name Divisions

1            2            3            4            5            6            7            8  
 Project-Originator-Assets-Location-Zone-Type-Discipline-Number

**Table AA2.1 Divisions**

Field No.	Content	Length (characters)	Reference
Field 1	ST150030	8	N/A
Field 2	Originator	3	N/A
Field 3	Asset Group	3	Refer to table AA2.2
Field 4	Location	2	Refer to paragraph A1.6
Field 5	Zone	2 or 3	Refer to table AA2.3
Field 6	File Type Code	2 or 3	Refer to table AA2.4
Field 7	Discipline	2	Refer to table AA2.5
Field 8	Number	4	N/A

- A1.2.1 Each field is separated by a hyphen i.e. "-"
- A1.2.2 Field codes can be replaced with X's where necessary if a code type is not applicable.
- A1.2.3 Note: software may have specific restrictions on file length or reference length and this will be managed on a case-by-case basis. Where software automatically generates outputs such as log files or PDF snapshots i.e. renditions, these will need to be renamed in accordance with this file naming convention.

A1.3 Field 1 - Project

A1.3.1 No further guidance.

A1.4 Field 2 – Originator

A1.4.1 Project Co will be issued with a 3 character "Originator" code.

A1.5 Field 3 – Asset Group

A1.5.1 Asset Group (3 characters) please refer to Table AA2.2

A1.5.2 This field enables broad asset divisions.

A1.5.3 Further subdivision of the asset class can be achieved through the use of the first two characters in Field 8.

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**Table AA2.2 Asset List for Silvertown Tunnel**

Code	Description	Example
BAS	Bridges & Structures	Footbridge
		Gantries
		Retaining Wall
		River Assets
		Road Bridge
		Tunnel
		Tunnel Services Compound
		Ventilation Room
		Carpark
CAR	Carriageway	Carriageway
COM	Communications	Tunnel communications system
		CCTV
CAI	Control & Information	Tunnel control system
		Tunnel incident detection and monitoring system
		Bus Related Technology
		Overheight Vehicle Detection
DRG	Drainage Systems	Tunnel pumped drainage system
		Drainage system
EAR	Earthworks	Earthworks
ELC	Electrical Systems	Tunnel electronic traffic and other signage system
		Tunnel lighting system
		Street Lighting
FAE	Fencing and Environment	Fencing and Noise Barriers
		Landscape
FRS	Fire System	Tunnel fixed fire-fighting system
KFP	Kerbs, Footways & Paved Areas	Pavement
MEC	Mechanical Systems	Tunnel ventilation system
POW	Power	Tunnel electrical power supply and distribution system
SFS	Street Furniture	Bus Shelters
		Road Restraint Systems
TRS	Traffic Signals & Ducting Layout	Traffic Signalling
TSL	Traffic Signs	Traffic Signs & Road Markings
MAC	Multiple Asset Classification	Multiple Assets

**A1.6 Field 4 – Location**

- A1.6.1 Location (2 characters) 2 alphanumeric characters to signify a location within the project.
- A1.6.2 Project Co shall use the Location codes in accordance with the BIM Execution Plan.
- A1.6.3 Detailed accuracy will be managed through additional meta-data fields stored in the CDE.
- A1.6.4 Project Co shall include a 6 figure OS Grid Tile reference into the file metadata.
- A1.6.5 Project Co shall use the 'Location – Field Codes' that are set out in the TfL Surface Road Space Management CAD Standards (as set out in Table A2.1 (*Standards*)).

**A1.7 Field 5 – Zone**

- A1.7.1 Zone Code (2 or 3 characters); please refer to Table AA2.3 below.

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**Table AA2.3 Zone List for Silvertown Tunnel**

No.	Zone Description	Code
1	To be defined in Project Co's BIM Execution Plan	Z0
2	To be defined in Project Co's BIM Execution Plan	Z1
3	To be defined in Project Co's BIM Execution Plan	Z2
4	To be defined in Project Co's BIM Execution Plan	Z3
5	To be defined in Project Co's BIM Execution Plan	Z4
6	To be defined in Project Co's BIM Execution Plan	Z5
7	To be defined in Project Co's BIM Execution Plan	Z6
8	To be defined in Project Co's BIM Execution Plan	Z7
9	To be defined in Project Co's BIM Execution Plan	Z8
10	To be defined in Project Co's BIM Execution Plan	Z9
11	To be defined in Project Co's BIM Execution Plan	Z10
12	All Zones	ZY
13	Multiple Zones	ZZ
14	No Zone	ZX
15	Supplementary Works Zones	To be provided by TfL, e.g. S1, S2, etc.

A1.7.2 Project Co shall use the Zone codes in accordance with the BIM Execution Plan.

A1.8 Field 6 – File Type

A1.8.1 File Type Code (2 or 3 characters); please refer to Table AA2.4 below.

A1.8.2 Project Co shall propose to TfL any additions to the list of approved File Type codes.

**Table AA2.4 File Type**

Group	Code	Document Type	Group	Code	Document Type
Assessment	ASM	Assessment	Consents/Applications/Licences/Certificates	CST	Consents
	ORC	Outline Risk Criticality Assessment		CTI	Consent To Install
	SAS	Structural Assessment		CTO	Consent To Operate
	SLA	Safe Load Assessment		CTS	Consent To Test Submission
	RAS	Risk Assessment		CNC	Concession
	DRA	Designers Risk Assessment		CRT	Gates Certificates
Commercial	BUD	Budget			Hand-Back Certificate
	EST	Estimate			Handover Certificate
	FOR	Forecast			Installation Release Certificate
	PMI	Project Manager Instruction		LCN	Access Licence (Land Referencing)
	PES	Project Estimate Summary			Licence
	QTA	Quotation		PEM	Permit
	POR	Purchase Order		CER	Certificate
	RQN	Requisition		APP	Application
Contract	PSC	Project Supervisor Communication		CON	Contract
	CVV	Curriculum Vitae			Framework Agreement
	INV	Invoice			Service Contract
	COD	Consultation Documentation			Agreed Interface Definition Document
	Correspondence	AGR	Agreement	COR	Communication Correspondence
		BUC	Business Case	MEM	Meeting Minutes
AGN				Agenda	
Design	DR	Administrative Boundaries	Forms/Template	SID	Site Diaries
		Drawing/Drawing Definition		TEM	Template
	SKE	Sketch		LST	List
	CM	Diagram		SUB	Submission
Composite Model					

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Group	Code	Document Type	Group	Code	Document Type	
	BMA	Base Mapping	Guide	GDE	Guide	
	BOQ	Bill of Quantities			Guideline	
	GDD	GIS Data Delivery			User Guide	
	ALG	Alignment			Works Guide	
	SUR	Survey	Health and Safety	HSF	Health and Safety File	
	BRF	Design Brief		HZA	Hazard Analysis	
	MAP	Map		SIN	Site Investigation	
	M2	2D Model File	Media	MED	MAN	Manual
	M3	3D Model File			Site Notice	
	VF	Visualisation File (of a model)			Project Information Sheet	
	RF	Resource File			Presentations	
	AF	Animation File (of a model)			Photograph	
	PC	Point Cloud			Induction Pack	
	CAL	Calculations			Brochure	
Forms/Template	FRM	Materials Approval Forms	Plan	PLN	Asset Commissioning & Handover Plan	
		Authority to Work Forms			Works Plan	
		Site Instruction Forms			Asset Group Plan	
		Works Order			Assurance Plan	
		Access Request Form			Environmental Management Plan	
		Load Application Forms			Human Factors Integration Plan	
	Space Allocation Forms	Health and Safety Plan				
DAT	Data Sheet					
Plan	PLN	Resource Plan	Report	REP	Audit Report	
		Human Resource Plan			Daily Progress Reports	
	PAP	Project Assurance Plan			Design Report	
	PEP	Project Execution Plan			Financial Report	
	PMP	Programme Management Plan			Interface Control Document	
	WPP	Work Package Plan			Internal Cost Record	

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Group	Code	Document Type	Group	Code	Document Type			
Programme	PRG	Look Ahead Programmes			Interface Definition Document			
		Programme			Proposal			
Quality	RFI	Request for Information					Reports	
	TEQ	Technical Query					RAM Report	
	SNL	Snagging List					Shift Reports	
	ITP	Inspection and Test Plan					Safety Inspection Report	
	AUR	Audit Schedules					Test Report	
	PAD ESC	Project Audit Documentation					INR	Inspection Report
		Engineering Safety & Assurance Case					Scope	SCO
	WAR	Warranty						
Register/Log	LOG	Hazard Logs	Statement		Scope of Works			
		Installation Logs			CDS	Conceptual Design Statement		
		LOG			CWS	Conceptual Work Statement		
		Manufacturing Logs			MST	Method Statement		
		Test Logs			RQS	Requirements Statement		
	ACH	Asset Commissioning Handover Log			REG	DCD	Designer's Compliance Declaration	
	REG	Asset Register				OSU	Outline Submission	
		Assumption Register				Specification/Strategy	SPE	Communication Specifications
	Register	Design Specification						
		Enabling Works Specs						
Factory Acceptance Test Specification								
Interface Requirements Specification								
Specification								

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Group	Code	Document Type	Group	Code	Document Type
		Purchase Specification			
		Test Specification			
		User Requirements Specification			
	POL	Policy			
	PRO	Procedures			
	STR	Asset Group Strategy			
		Procurement Strategy			
		Strategy			
	REQ	Requirements			
	STD	Standard			
	SCH	Schedule			

A1.9 Field 7 – Discipline

A1.9.1 Discipline (1 or 2 characters) please refer to Table AA2.5 below.

A1.9.2 Project Co shall select the Discipline that best reflects the status of the creator of the data or information.

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**Table AA2.5 Discipline**

Code	Description	Code	Description	Code	Description
A	Architect	IM	Information Management	TG	Technology Engineer
AC	Archaeology	IN	Interface Management	TM	Transport Modelling/Networks
AD	Administration	IT	Information Technology	TR	Traffic Engineer (Road)
B	Building Surveyor	L	Landscape Architect	UD	Urban Designer
C	Civil Engineer	LE	Lighting Engineer	UT	Utilities
CL	Construction & logistics	LG	Legal	WR	Water Environment
CM	Change Management	LP	Land Property/Quality/Use	WS	Waste & Resources
CN	Consultation	LV	Landscape and Visual	YH	Heritage
CO	Community	M	Mechanical Engineer	ZZ	General (Non Disciplinary)
CP	Commercial & Procurement, Contracts, Finance	NA	Noise and Acoustics, Vibration		
D	Drainage, Highways Engineer	P	Public Health Engineer		
DM	Design Management	PM	Project/Programme Management		
E	Electrical Engineer	PS	Planning & scheduling		
EN	Environmental	Q	Quantity Surveyor		
F	Facilities Manager	QM	Quality Management		
FE	Fire Engineer	RE	Rail Engineer		
G	Geographical and Land Surveyor	RM	Risk Management		
GE	Geotechnical Engineer	RQ	Requirements Management		
GG	Geology	RS	Railway Systems		
GS	Geographical Information Systems	S	Structural Engineer		
H	Heating and Ventilation Designer	SM	Stakeholder Management		
HR	Human Resources	SU	Sustainability		
HS	Health & Safety	T	Town and Country Planner		
I	Interior Designer	TE	Tunnel Engineer		

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A1.10 Field 8 – Number

A1.10.1 Unique Number - (4 digits)

A1.10.2 A four digit numeric code is used to increment document numbers where the preceding six fields are the same, thus ensuring that each document within the Originator dataset has a unique number. The code can be amended to six digits should there be a later requirement for expansion.

A1.10.3 Project Co shall create all necessary placeholders within the CDE prior to upload of files.

A1.11 Revision

A1.11.1 Revision will be entirely controlled by the CDE. It will align to BS1192:2007 as follows:

A1.11.2 P01.n where n is equal to version. Therefore, the P01, P02 etc. will be the revision, which is attributed at the point of sharing or publishing a file. The n such as P01.1, P01.2 etc. will be the version that is applied to track work in progress updates.

A1.12 Suitability

A1.12.1 Suitability shall follow BS1192:2007 – Table 5.

A1.12.2 Within the CDE when sharing or publishing a file, a drop down menu will give a choice, but only the choices contained in Table AA2.6.

**Table AA2.6 Suitability**

Code	Suitability
<b>WORK IN PROGRESS</b>	
S0	Initial non-contractual code.
<b>SHARED</b>	
S1	Fit for coordination
S2	Fit for information
S3	Fit for internal review and comment
S4	Fit for approval
<b>PUBLISHED</b>	
A	Fit for construction
B	Fit for construction with comments
C	Comprehensive revisions needed
<b>ARCHIVE</b>	
AB	As Built

**Annex 2 of Part 5 – Information Security****1. General**

- 1.1 Project Co acknowledges that it is aware of the range of potential security issues which are applicable to Project Co's and TfL's businesses, IT systems, assets, personnel and other occupants or Users. Project Co shall adopt a security-minded approach to information management whilst working in a digital built asset environment and to that end, develop its Information Security Strategy in accordance with:
- 1.1.1 PAS 1192-5:2015 (*Specification for security-minded building information modelling, digital built environments and smart asset management*); and
  - 1.1.2 ISO/IEC 27001 (*Information Security Management*).
- 1.2 Project Co shall provide details in the Information Security Strategy of how it will meet Project Co's requirements set out in this Annex 2 (*Information Security*).
- 1.3 Project Co shall provide details within the BIM Execution Plan of how it plans to manage the Information Security Strategy, in accordance with Part 5 (*Information Management*) of Schedule 8 (*Management Systems*).

**2. Key security management processes**

- 2.1 Project Co shall apply the security triage process outlined in PAS1192-5: 2015 to identify the need for a security-minded approach and to determine the security classification to be applied to the built asset and associated asset information, as a whole or in part, and whether planned or existing shall agree such classification with TfL.
- 2.2 Project Co shall produce and manage all information relating to the Works and the Services (including Design Data) which Project Co is required to submit to TfL under this Agreement in accordance with the "*TfL Standard - Information Security Classification*", as referred to in Table A2.1 (*Standards*) of Annex 1 (*TfL Information Requirements*).
- 2.3 Project Co shall appoint a suitably qualified and experienced individual to fulfil the role of "Built Asset Security Manager" as defined in and in accordance with the role description in PAS 1192:5:2015.
- 2.4 Project Co shall ensure that its Information Security Strategy includes a Built Asset Security Strategy as defined in PAS1192-5:2005 (the "**BASS**") which shall include a built asset security risk management strategy appropriate to the security classification level applied to the Project.
- 2.5 Project Co shall develop the BASS taking into consideration the relevant Applicable Requirements.
- 2.6 Project Co shall establish a suitable mechanism for performing periodic reviews of the BASS throughout the lifecycle of the built asset to identify and assess any risks which have changed for political, economic, social, technological, legal or environmental reasons, and which impact on the built asset, asset information and/or digital systems.
- 2.7 Project Co shall ensure that its Information Security Strategy includes a Built Asset Security Management Plan as defined in and in accordance with PAS1192-5:2015 (the

"**BASMP**") for the lifecycle of the built asset which addresses the specific security risks or combinations of risks identified in the BASS in a consistent and holistic manner.

- 2.8 Project Co shall document within the BASMP and provide to TfL details of the secure development, testing and review processes in place for any software or hardware being procured and operated by or on behalf of Project Co and take into account any reasonable recommendations made by TfL.
- 2.9 Project Co shall ensure that its Information Security Strategy includes Built Asset Security Information Requirements as defined in and in accordance with PAS1192-5:2015 (the "**BASIR**") for the lifecycle of the asset which sets out specific information requirements around sensitive asset/systems based on the policies, processes and procedures contained in the BASMP.

### **3. Cyber Security**

- 3.1 Project Co shall develop as part of the BASMP, a cyber security plan which:
- 3.1.1 follows the principles of the "*TfL Standard – Cyber Security Management Schedule*" referred to in Table A2.1 (*Standards*) of Annex 1 (*TfL Information Requirements*); and
- 3.1.2 takes into account the technical security considerations for the cyber-physical systems that are employed in the digital built project environment.
- 3.2 Project Co shall ensure that its cyber security plan developed in accordance with paragraph 3.1 includes:
- 3.2.1 an operational technology cyber security standard that defines the requirements for the procurement lifecycle of new operational technology assets, upgrades to existing operational technology assets, and the operation and maintenance of these assets;
- 3.2.2 a system access control standard that details the security controls that Project Co will put in place for limiting access to sensitive information or systems by account type (including standard, shared, privileged and system accounts). This includes the requirements for providing accounts and the password policy for each account type;
- 3.2.3 a network cyber security standard that defines the security requirements for all IT networks that are owned, operated or supported on behalf of TfL including the cyber security of networks and infrastructure, the information contained on them and how remote access must be managed;
- 3.2.4 a secure builds and configurations standard that details the security controls that Project Co will put in place to secure devices and endpoints. This includes cyber and physical protection, mobile devices, security testing and secure disposal criteria;
- 3.2.5 a security logging, monitoring and audit standard that details the controls that Project Co will put in place for monitoring and auditing systems, devices, networks and user accounts, including the logging and review of the results of this monitoring activity; and

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- 3.2.6 a security patching standard that details the requirements for applying security-related updates, how to identify the criticality of a patch and the timescales for implementing a patch in order to secure systems and applications.
- 3.3 Project Co shall put in place appropriate risk assessment and risk mitigation plans to reduce the impact of failure or disruption on its operations and those of its stakeholders, in the event that the provisions in the BASS and BASMP fail, which:
- 3.3.1 have regard to business continuity and disaster recovery scenarios that may affect the operation and viability of projects utilising digital technologies and digital built assets; and
- 3.3.2 follow the principles of the "*TfL Standard – Cyber Security Management Schedule*" referred to in Table A2.1 (Standards) of Annex 1 (*TfL Information Requirements*).
- 3.4 Project Co shall:
- 3.4.1 notify TfL whenever it identifies a cyber security risk relating to the Project;
- 3.4.2 disclose any known cyber security vulnerabilities relating to the Project that may have an impact upon TfL; and
- 3.4.3 notify TfL immediately of any cyber security incidents relating to the Project that occur.
- 4. Compliance Plan**
- 4.1 Project Co shall provide details within the BIM Execution Plan of how compliance with ISO/IEC 27001 (*Information Security Management*), the Information Security Strategy and "*TfL Standard - Information Security Classification*" will be monitored and managed.
- 4.2 Project Co shall allow TfL to carry out security reviews and audits, including the assessment and management of any security issues or risks that may arise and take into account any reasonable recommendations made by TfL. In doing so, Project Co shall follow the principles of the "*TfL Standard – Cyber Security Management Schedule*" referred to in Table A2.1 (*Standards*) of Annex 1 (*TfL Information Requirements*).
- 5. Working with suppliers**
- 5.1 Project Co shall manage its supply chain security risks by having in place contractual provisions with its suppliers which support the security policies, processes and procedures contained within the BASMP and BASIR.
- 6. Asset Management**
- 6.1 Project Co shall create an information management role which assumes responsibility for maintaining, managing and providing appropriate security for the built asset information throughout its operational life.
- 6.2 As part of the operational function, Project Co shall ensure that the information management role is responsible for access permissions for those who can create, read, update and delete information. Project Co shall ensure that the control of access shall be

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in accordance with the BASMP and associated security policies, processes and procedures, including the requirements set out in the BASIR.

## **7. Information Requirements**

- 7.1 Project Co shall set out in the BIM Execution Plan requirements for data drops and information exchange requirements taking into account:
- 7.1.1 identification of sensitive information to which specific security requirements will apply;
  - 7.1.2 specific security requirements related to individual data drops; and
  - 7.1.3 expected level of detail for models at each work stage including, where applicable, the maximum for sensitive assets and systems in accordance with the BASIR.
- 7.2 Project Co shall set out in the BIM Execution Plan its collaboration process across the supply chain. The collaboration process should include detailed proposals to manage restrictions around the sharing of data and information relative to sensitive assets and systems, as required by the BASMP.
- 7.3 Project Co shall determine a strategy for planning of work and data segregation in accordance with the processes described in PAS 1192-2:2013 and BS 1192:2007+A2:2016. Such strategy must consider the use of separate project volumes for sensitive assets and systems.
- 7.4 In relation to the CDE, Project Co shall as a minimum:
- 7.4.1 take into account the security requirements of the BASS when implementing the CDE (in particular, the use of cloud services);
  - 7.4.2 determine the physical security arrangements that are to be used to prevent unauthorised access to the data and IT equipment used to deliver the service including user access and vetting to its systems;
  - 7.4.3 have regard to the enhanced protection requirements relating to the management of access to the CDE which contains data or information about a sensitive asset;
  - 7.4.4 have regard to the enhanced protection requirements for neighbouring built assets which are not publicly available held within the CDE;
  - 7.4.5 where the CDE, model(s), or information exchange does, or will, include any personally identifiable or sensitive information, or any commercial information, put in place the appropriate processes and procedures in place to protect the information; and
  - 7.4.6 undertake a review of the CDE hosting provider's incident management plan (where applicable).



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**Annex 3 of Part 5 – Project Co Information Management Proposals**

**Commercially sensitive information**