Transport for London

SCHEDULE 7B

Form of Agreement – Short Form Call-Off Contract

Call-Off Contract Number: ENG Task 236 - Embedded Track Rail Replacement & Drainage Design Shirley Hills Road Crossing Project

Framework Lot: E22 - Track Configuration

Outline Agreement: 4600008094

THIS AGREEMENT is made the 31st day of March 2023

BETWEEN:

(1) **Transport for London (TfL), ("the *Employer*"** which expression shall include its successors in title and assigns); and

(2) **AECOM Limited**, a company registered in England and Wales (Company Registration Number 01846493) whose registered office is at Aldgate Tower, 2 Leman Street, London, E1 8FA **("*the Consultant*")**

WHEREAS:

This Agreement is made pursuant to a framework agreement between the Parties relating to the provision of **TfL PSF2 94203 - Engineering Consultancy Services dated 2nd September 2021** ("the Framework Agreement"). The *Employer* wishes to have provided Consultancy Services as contained in Table 3. The *Employer* has accepted a proposal (Table 4) by the *Consultant* for the Services in accordance with the Short Form Conditions of Contract (as defined in the Framework Agreement).

NOW IT IS AGREED THAT:

Terms and expressions defined in (or definitions referred to in) the short form conditions of contract have the same meanings herein. The *Consultant* provides the Services in accordance with the Short Form Conditions of Contract, Tables, Schedules and Attachments. The *Employer* pays the *Consultant* the amount due in accordance with the Short Form Conditions of Contract. The documents forming this Call-Off Contract are:

This Form of Agreement duly executed by the Parties;
Short Form Conditions of Contract;
Table 3, Table 4 and Table 5;
The Attachments;
The Schedules.

Where there is any discrepancy or conflict within or between the documents forming the contract the order of priority shall be as follows:

First : This Form of Agreement;
Second : Table 5;

Third	:	Table 3;
Fourth	:	The Schedules;
Fifth	:	Short Form Conditions of Contract;
Sixth	:	Table 4.

1. Notwithstanding the manner of execution of this Agreement it is agreed that:

1.1 the limitation period within which any claim may be brought by the *Employer* for breach of this Agreement by the *Consultant* is 6 years from the date of breach; and

1.2 the *Consultant* agrees not to raise in defence of any such claim a shorter limitation period whether pursuant to the Limitation Act 1980 (as the same may be amended or re-enacted from time to time) or otherwise.

This Agreement has been signed for and on behalf of the *Employer* and the *Consultant* the day and year written above.

Signed by
for and on behalf of
the Consultant

[redacted]

Signed by
for and on behalf of
the Employer

[redacted]

Table 3, *Employer's* Requirement:

London Trams undertakes a programme of annual renewals of all sections and types of track. The renewal of the section of track on Shirley Hills Crossing between Coombe Lane and Gravel Hill tram stops is programmed as part of London Trams' assets replacement. This requires a design to be produced and is thus being procured.

The full design criteria and services required are included under Attachment 1 – Employer's Scope of Works.

Table 4, *Consultant's* Proposal:

The Consultant's Proposal sets out the technical approach for achieving the objectives for this Project. See Attachment 2 - Consultant's Proposal.

Due to the delay on the envisaged Contract Commencement date, the Consultant shall submit a revised Delivery Programme by a date agreed with TfL at contract inception.

Where there is any discrepancy or conflict within or between the documents forming the Consultant's entire proposal which for the avoidance of doubt consists of Attachment 2, Attachment 3, Attachment 4 and Attachment 5, the order of priority shall be as follows:

1. Attachment 5 (Proposal Programme v4.0) and Attachment 4 (Consultant's Pricing Schedule)
2. Attachment 3 (Tender Queries and Assumptions Log)
3. Attachment 2 (Consultant's Proposal)

Charges:

Pricing Option A – Fixed Priced with activity schedule

The total cost of the services is fixed at [redacted] and shall not exceed this amount.

See Attachment 4 - Consultant's Pricing Schedule.

All proposed Day Rates shall remain fixed for the life of this Call-Off Contract, including any contract extensions.

TfL will not reimburse any additional costs for time, input, resource or other without prior written consent from TfL's Employing manager.

Table 5, Contract Particulars:

SAP Ariba Contract ID: CW44183
Contract Number: ENG Task 236 - Embedded Track Rail Replacement & Drainage Design Shirley Hills Road Crossing Project
The Contract Commencement Date is: 03/04/2023 (Inception meeting) The Service Commencement Date is: W/E 03/04/2023 The Call-Off Term is: 1 year and 6 months - Contract shall terminate 02/10/2024, unless otherwise extended. The Call-Off Contract may be extended for a further 3 months. However any extensions will be at the *Employer's* own discretion and subject to the appointed *Consultants'* satisfactory performance, ongoing requirement and funding availability. This will be confirmed and mutually agreed in writing.
In accordance with Clause 7.1 of the Short Form Conditions of Contract, the *Employer's* Contract Manager is: [redacted]
In accordance with Clause 7.1 of the Short Form Conditions of Contract, the *Employer's* Procurement Manager is: [redacted] Transport for London 6th Floor, Yellow Zone, 14 Pier Walk, London, SE10 0ES
In accordance with Clause 8.5 of the Short Form Conditions of Contract, the *Consultant's* Key Persons are: [redacted]

AECOM Ltd Aldgate Tower, 2 Leman Street, London, E1 8FA
Notice period in accordance with Clause 25.4 of the Short Form Conditions of Contract (termination without cause): 30 days
Payment Period: (see Clauses 5.1 and 5.4 of Short Form Conditions of Contract) Clause 5.1 - The invoice period shall be 4-weekly in arrears. Clause 5.4 - Payment will be made within 30 days of receipt of invoices.
Consultant **must** send invoices via email, in pdf format, to: Invoices@tfl.gov.uk Invoices should be addressed to: Transport for London Accounts Payable P.O. Box 45276 14 Pier Walk, SE10 1AJ All invoices must have TfL Contract Reference Number, Purchase Order number, TfL Contact name, a separate calculation of VAT and a brief description of the Services provided.

Attachment 1 – Employers Scope of Works

Attachment 1 – Employer's Scope of Works

Transport for London

Embedded Track Rail Replacement & Drainage Design

Shirley Hills Road Crossing

Project Design Brief

Reference: LT-TRS-ETR-009 Version 1.0

Date of issue: September 2022

Contents

1 Introduction

London Trams undertakes a programme of annual renewals of all sections and types of track. The renewal of the section of track on Shirley Hills Crossing between Coombe Lane and Gravel Hill tram stops is programmed as part of London Trams' assets replacement. This requires a design to be produced and is thus being procured. The full design criteria are highlighted in this document.

The desired outcome of this programme is the renewal of London Trams track assets using new componentry, where appropriate, aiming for the improvement on the efficiency of whole life cycle of the assets.

To achieve this outcome London Trams require a design consultant to undertake the works described in this document.

All activities henceforth described must comply with the appropriate London Trams IMS Standard. If none is applicable a Technical Query should be submitted, and London Trams will advise of the appropriate Standard to be applied.

The design and Survey team will also be required to ensure that all personnel or sub-consultants requiring access to the London Trams Network have successfully completed the Tram Safety Awareness course (Pink Ticket). This course is provided by the Operator (TOL) and can be arranged through London Trams at the Consultant's expense (approx. cost £100 per person).

2 Project Scope

2.1 Description of site

This site is located on the section of track between Coombe Lane and Gravel Hill Tram Stops on line T4 and within a residential environmental.

- The site is approximately 70m long single track, between Ch 04.575mm and Ch 04.645m.
- The limits of intervention shall be defined upon completion of the survey and be dependant on, among other criteria, track geometry and weld locations

The Technical Requirement Specification, which includes an indicative schematic of the site, can be found in Appendix A.

2.2 Project Specific Requirements

- Undertake full topographical survey of the site.
- Undertake a full track formation investigation, including a ground investigation survey and a report on buried services.
- Undertake a full heights and staggers survey of the existing OLE system in the worksite.
- Deliver a Permanent Way, Drainage, Civils, and a Highway design including road markings based on the original As-built information, but all achievable improvements should be included. The design must be approved through an IDR process.
- As the requirements are well defined, a Technical Requirements Specification has been produced for this project which can be found within Appendix A and the consultant is required to design in accordance to it.

3 Surveys

The extents of surveys shall be enough to cover the extents of the renewal plus enough length on either side to ensure an acceptable tie-in to all existing infrastructure is achieved. This length is to be agreed with London Trams.

All surveys shall adhere, unless otherwise specified, to the following standards:

- NR/L2/TRK/3100 Topographic, Engineering, Land & Measured Building Surveying: Strategy & General
- NR/L3/TRK/3101 Topographic, Engineering, Land & Measured Building Surveying – Track
- NR/L3/TRK/3102 Topographic, Engineering, Land and Measured Building Surveying - Civils Surveying
- NR/GN/TRK/3103 Topographic, Engineering, Land & Measured Building Surveying: Survey & Mapping Techniques
- LT-IMS-ENG-561 Track alignment and design.

3.1 Topographical Survey

A full topographical survey of the site must be undertaken by the Consultant.

The details required as part of the topographical survey should indicatively include, but not be limited to:

- Running edge of all rails included in the survey area
    - Collection of data at 5m stations for all lines, including LH and RH running rails on plain line including the tie-ins throughout the renewal extents
    - Collection of data at 1m stations for the existing full upstands at the tie-ins in relation to the rail to ensure that the rail is aligned with the upstands.
    - Collection of any further details to allow for an acceptable design to be achieved.
- Any structures (railway related or otherwise) within 3m of the any running rail shall be surveyed
- Any catchpits, manholes or any other drainage structures and/or channels
- All relevant Permanent Way details. Including but not limited to, and where applicable:
    - Existing welds in the tie-in area
    - Visible track bonds
    - Induction loops
    - Insulated joints
- Full heights and staggers survey of the OLE system at the site.
- Any other data deemed relevant by the Consultant or London Trams for the completion of design or construction phases of the project.

3.2 Track formation and ground investigation

The Designer is to survey and investigate the existing ground and track formation around influence of the project. The extents of this study shall be at least the same as the topographical surveys and are subject to agreement with London Trams.

The track formation and ground investigation shall provide enough detail to achieve, at least, the following objectives:

- Provide enough information for the Consultant to evaluate the condition of each component of the track formation and assess the extent of the renewal required.
- Provide sufficient information to the Employer to assess the risk of the track slab requiring remedial work of being damaged during the renewal.
- Obtain any additional information deemed necessary by the Consultant, or London Trams, for the objectives of the project to be achieved.

The methodologies applied should be a combination of GPR, Coring and FWD as a minimum. The Consultant should advise the preferred methods to be used.

This study shall provide enough detail for the Designer to evaluate how adequately and functional each component of the system is performing, as well as assessing the overall system performance. In addition, the Designer shall suggest design solutions to rehabilitate the system through a value-engineering approach and with minimal intrusion to the system.

3.3 Utilities Survey

The Designer is to undertake a full survey of the existing utilities and buried services, to include any water and Sewerage services, communication, Power, Gas and Electrical Services as a minimum around influence of each project. The extents of this study shall be as a minimum, the same as the topographical surveys but are subject to agreement with London Trams.

The Designer should capture all London Tram services as well as utilities in the drawings to ensure they are considered in the design and construction of the project.

This survey shall allow for the Designer to understand how design decisions will impact the existing services and utilities.

3.4 Drainage Survey

The current drainage configuration does not allow adequate drainage of water from the road which currently runs off into the ballast. This has resulted in a contaminated ballast, especially at the east side of the crossing.

The Designer shall design a new drainage system that will collect all water running off from the road. It is to note there is not any active track drainage system in the proximity of the road crossing. The closest catchpits are approx. 250m on both side of the crossings.

The as-built designs are included and provides all information on the existing drainage.

3.5 Other Surveys

The Designer should list any other surveys that are deemed necessary for renewal of slab track bridge (e.g. Reinforcement position), design of Anti-tress passing or foot/pedestrian crossing, S&C or any other.

4 General Requirements

The Designer shall also be available and should allow for meetings relating to the sites progress. These are tentatively predicted to be the following:

- Project Kick-off meeting
- Site assessment and familiarisation walk
- Bi-weekly Design progress meeting
- 2 No. Inter Disciplinary Review Meetings (Initial & Final IDR)
- Attendance on-site during the works (if required)
- 1 No. Lessons Learnt meeting

4.1 Track Alignment Design

The designer is required to produce a track alignment design for the site.

The designs shall incorporate all relevant information from the surveys detailed on section 3. Additionally, the extent of the designs shall be, at a minimum, the extents described in section 2 plus a length as required to achieve a compliant tie-in to existing infrastructure.

The design shall be based on the existing as-built alignment, with any proposed improvements to be cognisant of any existing infrastructure constraints and constructability.

All designs must also consider all the existing components of the embedded track system at each location and include provisions for the re-installation of all components to enable London Trams to operate the required level of service. This includes the components being renewed and any components that, not being renewed, are required to be moved and reinstated during the works. The Consultant must identify in the designs all the above.

4.2 Drainage Design

The current configuration does not allow adequate drainage of water from the road which currently runs off into the ballast and has resulted in contaminated ballast, especially at the east side of the crossing.

The Designer to complete a full review of the existing site conditions and provide an optioneering report for London Trams review and an option selection workshop to be completed to agree on the way forward.

The new design and installation to include provision of a new drainage system that will collect all water running off from the road.

All designs must consider the existing utilities and services (buried or otherwise). Any implemented solutions shall not negatively impact any of these services or utilities

4.3 Overhead line equipment Design

The designer to review & propose heights and staggers adjustments in relation to proposed track alignment. This shall be extended beyond the renewal limits as required.

The Designer must also provide evidence that the standards for heights and staggers to the OLE system are met by the proposed designs.

4.4 Civil & Highway Design

The designer must ensure a civil design is provided for below elements of Works considering the existing utilities and services (buried or otherwise). Any implemented solutions shall not negatively impact any of these services or utilities.

- The existing road surface consists of a track slab with a shallow upstand. The road surfacing is right up to the top of rail with allowance for a suitable sealant material between rail and bituminous pavement. A full concrete upstand, up to top of rail level, is to be designed on top of the existing shallow upstand to restrict the rail lateral movements and avoid longitudinal cracking at the interface between the track slab and flexible pavement.

- New road surface to be designed from kerb to kerb.
  Asphalts should comply with BS EN 13108 and BS PD 6691 And design manuals for road and bridges- BD21,BD63 & HD41
    1. 40 mm thick 0/10 SMA surf pmb
    2. 60 mm thick 50/20 HRA bin 40/60

  The polymer-modified binder (pmb) option is important in the asphalt surface course.
- For the Surface Course, skid resistance properties. 65 PSV is required, Max. AAV 16
- The following two proprietary products are acceptable, similar materials produced by other manufacturers will be considered:
    1. 10mm ‘Ultiphalt HD’ by Tarmac,

2. 10mm ‘SMAtex Industrial HD’ by Aggregate Industries to be installed in accordance with BS 5400-2 to carry 45 units of HB loading.

- Details of any required modifications to the existing track slab due to interface with other disciplines such as OLE, Power or Drainage.
- All road markings to be repainted in accordance to Highway standards and swept marking requirements detailed in LT-IMS-ENG-860_Tram-Infrastructure Interface.
- Rail welds locations to be positioned outside highway to avoid the where the road vehicles cross the track.

4.5 Power Design

Survey to be completed for all negative bonding on the track i.e. rail to rail or track to track as well as bonding connection at the insulator track joints.

All track bonding shall be reinstated in its current location unless required by the design and accepted by London Trams.

4.6 Stressing Design

Designer to develop a stressing plan and get it approved as part of design process in accordance with LT Standards.

The ballast within the stressing limits shall be well dressed with full cribs and properly compacted.

4.7 Strail Panels

There are no Strail panels located within the renewal limits.

Designer to confirm if panels on both sides of the crossing at Ch04.560 will be affected and required to be removed for the stressing or realignment works.

4.8 Gauging Clearance

The Designer must provide evidence that all designs are compliant with the appropriate standards in terms of clearance to any lineside structures including tram stop and bridges.

4.9 Compliance

The designs shall be compliant with all applicable London Trams IMS Standards. If none is applicable a Technical Query should be submitted, and London Trams will advise of the appropriate Standard to be applied.

The Designer must provide evidence that an internal check and approval process on the designs has been performed for the disciplines involved. This check shall follow the standards for a London Underground Category 2 design check.

All designs will be subject to an Interdisciplinary Design Review (IDR) approval process in accordance with LT-IMS-ENG-106 (Assurance of New and Altered Assets).

4.10 Deliverables

The Designer will be required to provide the following documents during proposal/award stage:

- Designer to submit a detailed Design Management Plan.

- Pre-Construction Information Pack
- Design Waste Management Plan
- A detailed programme for design stage. This shall include proposed milestones, completion dates and resource schedule. A project designated person shall be named to act as a single point of contact.
- For completion of the design stage of works the Designer is required to deliver the following documents. The list of documents below is not necessarily exhaustive and the Designer shall not limit the provision of documents to those listed.
- Design report for the project including, as a minimum the following information:
    - Outline of works
    - Description of existing site conditions
    - Site constraints
    - Track alignment design criteria and rationale
    - Civils and Highway design rationaleWeld/joint placement strategy
    - Full list of track components and respective specification with full description of where these are different to the existing including evidence supporting any changes
    - Operational and Maitnenance manual for any new components introduced as part of design
    - Rail bending schedule for the rails and required lengths for issue to a rail manufacturer
    - Services and utilities interface report
    - Lifts and slew sheets for each intervened track
    - Risk and hazards register (including those applicable through CDM regulations)
    - Assumptions and clarifications register
    - Request for information register
    - Gauging/passing clearance report
    - OLE heights and staggers report
    - Stressing Plan
- Specification for construction (as required)
- Cross section for all areas (Track, drainage, slab etc) where applicable
- As-built drawing following construction
- Assessment of OLE As-built following construction
- All drawings to be provided to TfL CAD team in micro station format for future reference

- Design drawings:
    - Soft copy in .pdf format and .dgn or .dwg format. XML files for each design must also be provided
    - 1:200 scale detailed permanent way horizontal plan
    - 1:20 scale detailed vertical profile (long-section)
    - 1:20 scale cross section examples in key interface points or each site
    - AfC drawings for all track formation works as deemed necessary by the Contractor or London Trams.
    - All design drawings must include the level of detail expected of an AfC design.
    - All designs must include details on services and utilities (where they exist) on plan and sections
- **CDM 2015**
    - The Consultant will be required to act as Principal Designer under the CDM Regulations 2015

5 Constraints

5.1 Access Arrangements for London Trams Infrastructure

Unless otherwise instructed by the Project Manager, the Consultant books, and co-ordinates access to the London Trams infrastructure in accordance with the London Trams Network Rules found within Appendix.

Engineering Hours

The engineering window Monday to Saturday mornings is between 01:20 and 04:30, typically giving three hours access, and between 01:20 and 06:15 given typically five hours access on Sunday mornings. The actual working hours will be less than this depending on the time to set up the possession or if a OLE isolation have to be taken for activities that depend on this.

Interrupted or delayed access

- Access may be interrupted or delayed should the Employer's operational needs dictate this. One example of this is the need to run 'ghost' trams during engineering hours possessions when freezing temperatures are forecast.
- Notwithstanding that ghost tram movements and other events causing the Consultant interrupted or delayed access are Employer's risks, the Consultant is expected to react, redeploy operatives and re-sequence the works to mitigate the effects in such circumstances where interrupted or delayed access may occur.
- The Consultant's programme, where possible, allows for and highlights such contingency work operations that can be rescheduled if interrupted or delayed access occurs. The Consultant must ensure that their Work Request Forms (WRF's) contain an agreed workaround methodology, to prevent the risk of unplanned cancellation of work if interrupted or delayed access occurs.

Training, certificates, identity cards and entry permits

- The Consultant is responsible for ensuring that all staff and personnel are suitably trained, competent and carry the appropriate and requisite certification for performing the roles required of them in carrying out the works.
- The Consultant must provide their own protection staff to deliver the works: Tramlink Possession Supervisor/Worksite Supervisor [TPS/TWS] and lookouts. The lookout should hold a valid TPS/TWS ticket.
- The Consultant is responsible for arranging, booking, and paying for all requisite medicals, training, and certification of its staff and/or personnel.
- The Consultant allows a minimum of four (4) weeks for all Employer provided training and certification courses. This must be included on the Programme for Acceptance. Any time period less than this cannot be guaranteed, and although efforts may be made to facilitate wherever possible, the Consultant does not rely on such reduced time periods being accommodated.
- The TPS and TWS shall wear the respective arm bands when undertaking duties on site.

Tramlink Safety Awareness (TSA) card (Pink Ticket)

- The minimum requirement to work in a Worksite in a Possession is a TSA certificate.
- All Consultant personnel working on London Trams infrastructure require a valid TSA card and designated Tramlink Possession Supervisor/Tramlink Worksite Supervisor (TPS/TWS) present to Access the Site and carry out works.
- The Consultant's personnel obtain their TSA cards by completing the half day training course and passing the written exam. The Consultant is responsible for arranging and paying for TSA training for their operatives and sub Consultants.
- A Tramlink Possession Supervisor/Tramlink Worksite Supervisor (TPS/TWS) card is required for staff that will supervise and book possessions and occupations. The Consultant is responsible for arranging this training for their operatives and sub Consultants.
- The TPS/Tramlink Work Supervisor (TWS) card and TSA card are specific to an individual, not transferable and are valid for a 2-year period.
- The Consultant's personnel must always carry their TPS/TSA card when in performance of this contract and present them to any authorised representative of the Employer for inspection when requested to do so. Failure to produce a valid card or requisite certification for inspection may result in the individual being instructed to leave site.
- The TPS/TSA cards do not entitle the Consultant's staff or personnel to any benefits other than permitting access to the Site for carrying out works during the agreed hours of work. The cards remain the property of the Employer and are required to be returned immediately upon request.

Access Control

- The Consultant should note that the Employer does not guarantee uninterrupted or exclusive access to or use of the Site. The Consultant is required to plan and manage booking and utilisation of all access to working areas. If Access has not been correctly booked, the Consultant will have no claim whatsoever for frustrated Access and it will not be considered a Compensation Event.
- When booking in and out of the Site the Consultant's staff and personnel report in, record entry and exit, and present their TSA/TPS cards when and where required in accordance with the local Access control arrangements.
- Tram Operations Limited (TOL) may at any time cancel pre planned possessions at short notice. The Consultant shall notify the Project Manager of shift cancellation charges in advance of commencing any works on site.

5.2 Traffic Management

The Consultant will be responsible for providing Traffic Management in line with attached Traffic Management Plan.

London Trams will arrange for the permits required for the works.

6 Programme

Below is the indicative proposal of when each design shall be started and completed. This will be finalised after contract award. It is imperative that the design process meets construction commencement dates which will be during a closure and therefore timebound. The consultant should submit a programme with their bid that complies with the timescales indicated below.

Milestone	**Date**
Contract Award	Dec 2022
Project Kick Off Meeting	Dec 2022
Design Start	Jan 2023
Issue of AfC Design – All Disciplines	March 2023
Construction Start on Site	October 2023

7 Appendix A – TRS

This section contains the Technical Requirements Specification (TRS) for the site.

This is attached as a separate document.

8 Appendix B – Reference Documents

8.1 Reference Drawing Register

INFORMATION / DRAWINGS		
Asset	**Drawing Name**	**Drawing Number**
Trackslab	Track slab – general construction details	96434B-15-C-40200_B0-A1
Civils works	Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section.	96434B-15-A-23060_B1-A1
Civils works	Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section.	96434B-15-A-23061_B1-A1
Civils works	Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section.	96434B-15-A-23062_B2-A1
Civils works	Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section.	96434B-15-A-23063_B1-A1
Drainage, Lighting and Road Markings	Shirley Hills Road, Coombe Lane and Gravel Hill Roundabout Road markings, drainage and road lighting.	96434B-15-A-23065_B1-A1
Plan and Longitudinal Section(1/2)	Shirley Hills Road, Coombe Lane and Gravel Hill Junction. Plan and Longitudinal Section.	96434B-15-A-23066_B0-A1
Plan and Longitudinal Section(2/2)	Shirley Hills Road, Coombe Lane and Gravel Hill Junction. Plan and Longitudinal Section.	96434B-15-A-23082_B0-A1
Junction Cross Sections	Shirley Hills Road, Coombe Lane and Gravel Hill Junction Cross Sections.	96434B-15-A-21085_B0-A1
Drainage, Lighting and Road Markings	Shirley Hills Road, Coombe Lane and Gravel Hill Roundabout Road markings, drainage and road lighting	96434B-15-A-21089_B2-A1
Track	Construction details at level crossings with embedded rails.	9434-15-S-40200_B0-A1
Fibre Cable	As built fibre cable route layout	CROYTRAM.ENGR.DRGS.395805-NAD-1802-R
Beacon Placement	Appendix C - Beacon Placement - Coombe Lane to Gravel Hill (EB) - R4 (v4_1)	Refer to name
Beacon Placement	Appendix D - Beacon Placement - Gravel Hill to Coombe Lane (WB) - R4 (v3_6_2)	Refer to name
Track Alignment	Coombe Lane to Gravel Hill	LTP14002-LT-PT-LT406_0-DR-K-0011
Track	Transition rail	sb2067708-20_transition rail 54G2-49E1
Drainage	Lower Addiscombe Rd	5196545-ATK-ZZ-ZZ-DR-D-0007_A02
Drainage	Crossing renewal at Beddington Lane general arrangement plan	VOL002-VOL-DRG-CIV-0001 CO3

8.2 London Trams Standard

Standard Number	Detail
LT-IMS-SHEQ -070	Drugs & Alcohol Policy
LT-IMS-ENG -070	Computer Aided Design
LT-IMS-ENG -072	Method Statement Guidance
LT-IMS-ENG -100	Managing Works general
LT-IMS-ENG -101	Inspections
LT-IMS-ENG -102	Occupations
LT-IMS-ENG -103	Possession Without Isolation
LT-IMS-ENG -104	Possession with Isolation
LT-IMS-ENG-105	Handover – Handback Procedure
LT-IMS-ENG-106	Assurance of NEW and Altered LT Assets
LT-IMS-ENG-107	LT Master Document List 9 included with Appendix 06-01 – WI600)
LT-IMS-ENG-108	Management of Derogations to LT Standards
LT-IMS-ENG-109	Derogation to LT Standards Application form
LT-IMS-ENG-110	Handover Detailed Pre works Walk out – Dilapidation Form
LT-IMS-ENG-501	Permanent Way Technical Specification
LT-IMS-ENG-502	Track Maintenance Standard
LT-IMS-ENG-502A	Track Maintenance Guidance Document
LT-IMS-ENG-510	Track Rail Stressing Procedure
LT-IMS-ENG-510A	Stressing Certificate
LT-IMS-ENG-510B	Stressing Method Matrix
LT-IMS-ENG-510C	Side Roller Frequency Matrix
LT-IMS-ENG-511	Prevention of Buckling
LT-IMS-ENG-526	Rail Welding Procedure
LT-IMS-ENG-560	Track Performance and Configuration

LT-IMS-ENG-561	Track Alignment and Design
LT-IMS-ENG-562	Track Inspection & Maintenance
LT-IMS-ENG-760	Substation and Circuit Breaker, Performance and Configuration
LT-IMS-ENG-761	Substation Inspection and Maintenance
LT-IMS-ENG-763	OLE Inspection and Maintenance
LT-IMS-ENG-764	OLE Performance, Alignment & Configuration
LT-IMS-ENG-860	Tram-Infrastructure Interface
LT-IMS-ENG-960	Civils Inspection and Maintenance
LT-IMS-ENG-961	Lineside Environment
LT-IMS-ENG-962	Drainage
LT-IMS-ENG-963	Civils Structures
LT-IMS-ENG-964	Buildings Premises and Tramstops
LT-IMS-ENG-1001	Waste Management
LT-IMS-ENG-2000	Technical Source Document
LT-IMS-ENG-2045	DKE, Structure Gauge and Clearance Requirements
LT-IMS-ENG-2050	On Track Plant Acceptance
LT-IMS-ENG-2051	On Track Plant Testing Procedure
LT-IMS-ENG-2099	Tram Interface Guidance
LT-IMS-PROC-SHE-050	Personal Protective Equipment
LT-IMS-SHEQ-100	Reporting Staff Accidents
Blank Period HSE Report 2020_21	HSE Period Report
Handback Form	Handback Form

9 Appendix C – Network Rules

Transport for London

London Trams - Track Renewals Portfolio

LT/TAR2223/RCR/01 – Shirley Hills Road Crossing Renewal

LT-TRS-RCR-005

Technical Requirements Specification (TRS)

		Signature	Date
Prepared by	I confirm that professional skill and care has been used in the preparation of this deliverable and it meets the project requirements.	[redacted]	24/08/2022
			24/08/2022
			24/08/2022
			24/08/2022
Approved by	I approve this deliverable as the designated co ordinating authority for these works and am accredited to do so. I also confirm that approval from the other affected discipline technical authorities has been completed.	[redacted]	24/08/2022
Accepted by	I accept this deliverable as the person responsible for its maintenance following delivery and handover and believe to the best of my knowledge that the above entities have undertaken and fulfilled their legal obligations as required with regard to this product.	[redacted]	24/08/22
			24/08/22
			24/08/22
			24/08/22

Approved by

I approve this deliverable as the sponsor authority for these works and am accredited to do so. I also confirm that approval from the asset managers has been completed.

[redacted]

24 August 2022

Accepted by

I accept this deliverable as the person accountable for its delivery and believe to the best of my knowledge that the above entities have undertaken and fulfilled their legal obligations as required with regard to this product.

[redacted]

Distributed to

[redacted]

Consulted

Name	Position
[redacted]	[redacted]
[redacted]	[redacted]

Document History

Revision	Date	Summary of changes
00.A	06/06/2022	Issued for review
01.00	24/08/2022	First Issue

Location	Between Coombe Lane and Gravel Hill Tram Stops		
Line:	T4	**Designation:**	EB & WB
Site Limits – approximate. T.B.C. subject to site configuration			
LCS From:	OA 04.575	**LCS To:**	OA 04.645
Site Length (approx.):	Approx. 70m		

PHYSICAL TIE IN – approximate. T.B.C. subject to site configuration

Running-On End (west to east)

Re-rail from: Ch 04.581m (EB) and Ch 04.579m (WB)

Cut in to remove the existing welds at this location. Tie-in points to be verified by survey and designs to ensure rail wear and alignment is sufficient to provide an acceptable location for welding

Start of slab (embedded section): Ch 04.596m (EB) and Ch 04.592m (WB)

FTR (forged transition rail), vignole rail S49 (49E1) to grooved rail 54G2, to be located in the first bed before the start of the road crossing.

Running-Off End (west to east)

Re-rail to: Ch 04.643m (EB) and Ch 04.635m (WB)

Cut in to remove the existing welds at this location. Tie-in points to be verified by survey and designs to ensure rail wear and alignment is sufficient to provide an acceptable location for welding

End of slab (embedded section): Ch 04.633m (EB) and Ch 04.626m (WB)

FTR, vignole S49 (49E1) to grooved 54G2, to be located in the first bed after the end of the road crossing.

Note: All chainages (Ch) are referenced to the OLE Mast located at the cess or 6 foot of the track.

BRIEF DESCRIPTION OF WORKSCOPE

Re-rail the full extent described above.

Contractor shall undertake a GRP survey to confirm the slab condition.

On ballasted track section, the rail profile is S49 (49E1). In the transition between ballasted to embedded track a forged transition rail (FTR) 49E1/Ri54G2 is required. In the road section (embedded track) a grooved rail shall replace the existing rail with a bolted keeper rail.

In the embedded section without upstands, a full concrete upstand shall be constructed up to top of rail level to restrict the rail lateral movements, avoid longitudinal cracking between the sealant and pavement and favour the independence between road and track renewals.

Road renewal to extend to 500mm outside of the outside rail and everything in between in addition to

any extra requirement agreed or stipulated by the road owner.

Road markings are to be reinstated as existing unless agreed otherwise with the council or a new requirement by any change in highway Standards .

At the transition from ballasted track to embedded track, the depth and length of the transition slab should be inspected and designer to specify the sleeper and ballast depth required.

The current configuration does not allow adequate drainage of water from the road which currently runs off into the ballast and has resulted in contaminated ballast. The new design and installation shall include provision of a new drainage system that will collect the water and debris running off from the road.

REMARKS:

- Rail welds to be positioned to avoid location where wheels of the road vehicles cross the track.
- The minimum closure rails to be installed shall be 9m minimum length.
- Ballast to be renewed with fresh ballast to a depth of 200mm, fully packed and consolidated from both sides of the road crossing to a distance of 10m from run-on and run-off of the road crossing this overlap could me more if propose by design.
- Realignment shall extend as required by design up to 100m beyond the site limits. Dilapidation survey and topographic survey shall be carried out to the realignment extend to check the track alignment conditions.
- The embedded track solution shall provide:
  - Continuous rail support
  - Electrical insulation
  - Broken rail containment
  - A precise installation that can ensure vertical rail inclination.

EXISTING TRACK	
Track configuration:	Ballasted Track Section: Existing track is 49E1 flat bottom rail with wooden and Tarmac concrete sleepers on Vossloh W14 fastening system. Embedded track Section: At the crossing itself, a bulb flat is fixed to the flat bottom rail and merged to the concrete slab. This is life-expired and bulb flat is no longer a preferred material due to its high failure rate.
Strail Panels	No strail panels within the re-rail limits. Contractor to confirm if panels at both sides of the pedestrian crossing at Ch 04.560 will be affected for the realignment or stressing works. 
Known Historical Problems	Bolted keeper rail broken in a few locations within the road crossing section. Poor vertical alignment of the existing keeper rail. Head wear and side wear on the running rails. At the west end of the road crossing, on WB track, the tram has contact with the concrete upstand shoulders.
Environment	The surrounding environment is residential. The A212 road support heavy traffic linking Lewisham to Croydon.
London Trams Applicable Drawings	LT Track Alignment Drawings LTP14002-LT-PT-LT406_0-DR-K-0011 Track drawing: sb2067708-20_transition rail 54G2-49E1 As Built Civil Drawings: • 96434B/15/C/40200 Roadbase/Trackslab Construction details

	• 96434B/15/A/23060_Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section • 96434B/15/A/23061_Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section • 96434B/15/A/23062_Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section • 96434B/15/A/23063_Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section • 96434B/15/A/23065_Shirley Hills Road, Coombe Lane and Gravel Hill Roundabout Road markings, drainage and road lighting • 96434B/15/A/23066_Shirley Hills Road, Coombe Lane and Gravel Hill Junction. Plan and Longitudinal Section • 96434B/15/A/21082_Shirley Hills Road, Coombe Lane and Gravel Hill Junction Longitudinal sections • 96434B/15/A/21085_Shirley Hills Road, Coombe Lane and Gravel Hill Junction Cross Sections • 96434B/15/A/21089_Shirley Hills Road, Coombe Lane and Gravel Hill Roundabout Road markings, drainage and road lighting • 96434B/15/S/40200_Construction details at level crossings with embedded rails. Gravel Hill track renewal: P15007-ARC-LT107-DR-C-0001_ Z01 (AS BUILT)_Modern_Road_Revised_Final_As_Built <u>Systems Information:</u> • CROYTRAM.ENGR.DRGS.395805-NAD-1802-R_As built fibre cable route layout • Appendix C - Beacon Placement - Coombe Lane to Gravel Hill (EB) - R4 (v4_1) • Appendix D - Beacon Placement - Gravel Hill to Coombe Lane (WB) - R4 (v3_6_2) “TRS Shirley Hills Road Crossing_Supporting information.zip”

GEOMETRY	
Design Requirements	Alignment design to support toperational line speed of 20km/h in this location with consideration given to the braking and acceleration of a tram entering and leaving the road.
Stressing	A stressing plan is to be developed and approved as part of the design process in accordance with LT standards. All ballast within the stressing limits shall be well dressed, with full cribs and properly compacted.
<u>NEW MATERIALS</u>	
BALLASTED SECTION	
Rail/Grade	49E1 grade R350HT CWR

Forged Transition Rails	49E1 to Ri54G2 Re-railing to incorporate back-to-back FTRs between 49E1 & Ri54G2 with forges located in the first beds off of the crossing
Sleepers	The old timber sleepers at both ends of the embedded track section should be replaced by new concrete sleepers as a preferable solution, otherwise composite sleeper will be preferable over timber sleepers. *Note: Contractor to confirm the depth of the slab transition in order to select the adequate sleepers.  Concrete sleeper specification: NTF1502 sleepers with Pandrol Fastclip 'FE' fastening system incorporated or new concrete sleepers suitable for S49 approved by TFL. Standard NTF1502 sleepers should be modified prior delivery to ensure compatibility with S49 (49E1) rail profile.
Ballast Depth	All the ballast beds should be renewed with fresh ballast to a min depth of 200mm, fully packed and consolidated to a min distance of 10m from run-on and run-off of the road crossing. Note: At the transition slab, the ballast depth shall be surveyed and defined.
EMBEDDED TRACK/ROAD CROSSING	
Rail/Grade	Ri54 / G2 CWR grade 290GHT-LC
Road Surface	The existing road surface consists of a track slab with a shallow upstand. The road surfacing is right up to the top of rail with allowance for a suitable sealant material between rail and bituminous pavement.

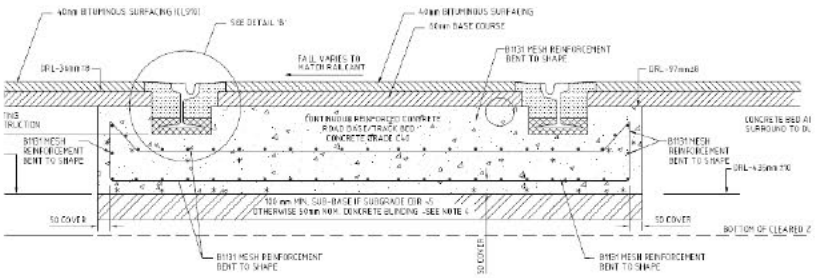


Figure: General detail of tracks slab in highway section. Cross section

In other areas of the network, a full concrete upstand, up to top of rail level, has been constructed on top of the existing shallow upstand to restrict the rail lateral movements and avoid longitudinal cracking at the interface between the track slab and flexible pavement. This design has been proven to be successful and therefore, a full concrete upstand shall be built in the highway sections and in the segregated sections with shallow upstand which are within the limits of the track renewal.

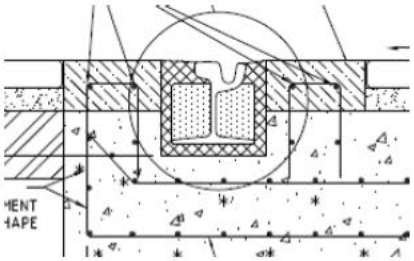


Figure: Full concrete upstand built on existing track slab

<u>Rail-Surface Level Requirements in Highways Sections:</u>

The max difference between top of running rail and concrete upstand should be ±3mm. Designer to design alignment flushing concrete upstand to allow ±3mm of installation tolerances. if the alignment doesn't achieve these level differences, scabbling and re-dressing the concrete surface to achieve a flush finish should be investigated

Note 1: There is a difference between top of running rail and keeper rail of 6mm, all level should be considered from top of running rail.

At pedestrian crossing at west side of the road, all surface shall be flushed to avoid any trip hazards for pedestrians.

Note 2: At the west end, on the WB track, the bottom of the tram currently contacts (scrapes) the concrete upstand due to the change of track curvature. Contractor should adjust the top of the concrete upstands to top of rail to correct this condition.

Between the highway sections, there is a short section with full upstand (to top of rail). The street surfacing is right up to the top of the concrete upstand. A gap to be filled with sealant shall be provided between rail and concrete upstand.

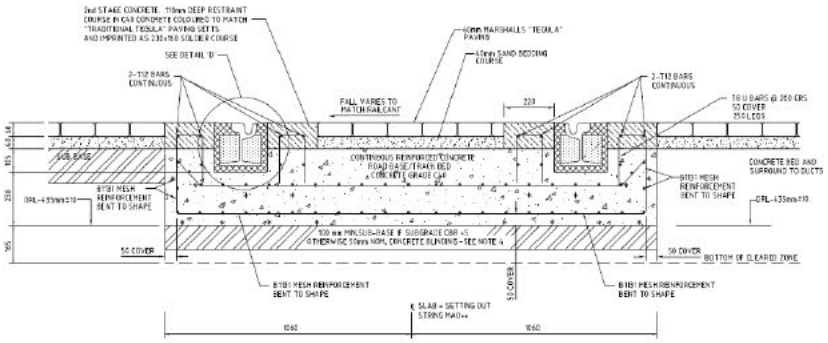


Figure: General detail of tracks slab in Segregated Section. Cross section

Whilst any alteration to the deterrent blocks paving or concrete upstand shall be reinstated or replaced like-for-like (same colour and finish).

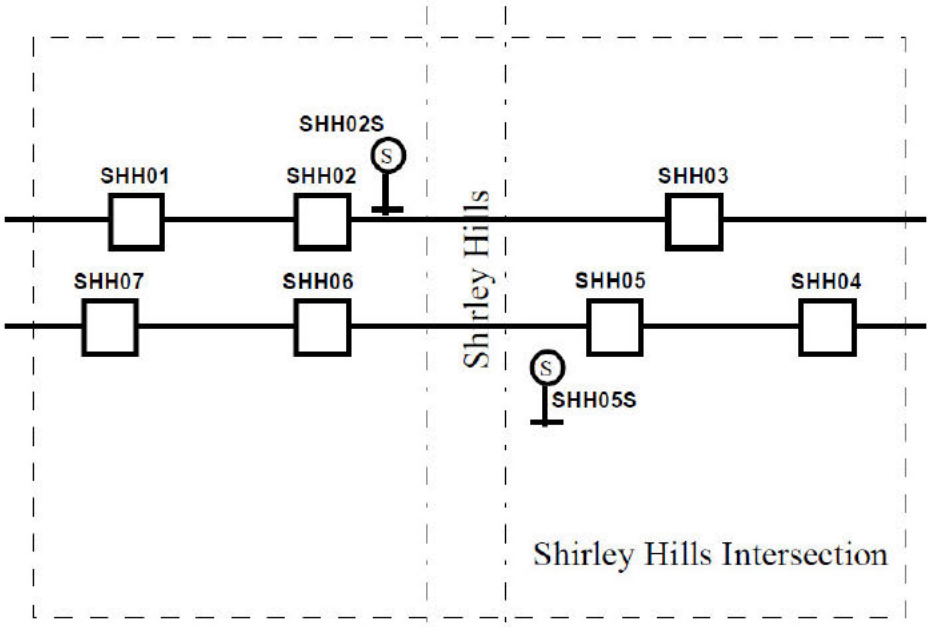
The existing paving is Marshall “Traditional Tegula” type and the deterrent blocks Marshall “Keycheck Deterrent Paving natural colour” to match existing

Sealant Requirements:

The sealant/coating between running rail and concrete upstand (in both highway and segregated sections) should have a minimum width of 55mm to avoid any contact

	between wheel tyre and concrete. In Highway sections, suitable highway approved sealant between the concrete upstand and the rail, with a minimum Skid Resistance Value (SRV) of 65 and an Aggregate Abrasion Value (AAV) of 16, to be installed between the rail head and the road/upstand.
Road Surface	In Highway section, a minimum width of 500mm from running rail is required to be re-surfaced or otherwise to be cut to an existing kerb. Asphalts should comply with BS EN 13108 and BS PD 6691. 1. 40 mm thick 0/10 SMA surf pmb 2. 60 mm thick 50/20 HRA bin 40/60 The polymer-modified binder (pmb) option is important in the asphalt surface course. For the Surface Course, skid resistance properties. 65 PSV is required, Max. AAV 16 The following two proprietary products are acceptable, similar materials produced by other manufactures will be considered 1. 10mm 'Ultiphalt HD' by Tarmac, 2. 10mm SMAtex Industrial HD by Aggregate Industries' New road surfacing to be installed in accordance with BS 5400-2 to carry 45 units of HB loading. **Rail welds to be positioned to avoid locations where the road vehicles cross the track.** All existing road markings to be refreshed, e.g. swept path markings, yellow lines, etc. All road markings to be compliant with Highway standards and swept marking requirements in accordance to LT-IMS-ENG-860 Tram-Infrastructure Interface

INTERFACES:	
SIGNALLING and COMMUNICATIONS EQUIPMENT	Contractor to carry out all surveys required to confirm all cable routes (lighting, power, signalling..) within the scope limits and propose any temporary works required for their protection and/or replacement. See referenced as built drawings for some information on cable routes (LT can not assure that other cables will not be found within the scope limits) The locations of the rail bond connections are to be agreed on site with Systems Asset Engineer and details reflected in the design drawings. Loop positions will be identified on site by the S&T team prior to design work starting to allow locations to be verified by the design contractor. If the loops are required to be removed during the works this will be done by the S&T team. The loops will then be replaced and tested by the S&T team before the works are completed.



Signals and loops location

This area is covered by PPOS, however none of the beacons are in the section of track to be replaced. PPOS drawings (including beacon positions) are included for information.

Fibre cables are installed as per the included as-built drawings. These cable routes should be verified by means of a site survey during the design phase (by the designer) to ensure they are not disturbed during the works.

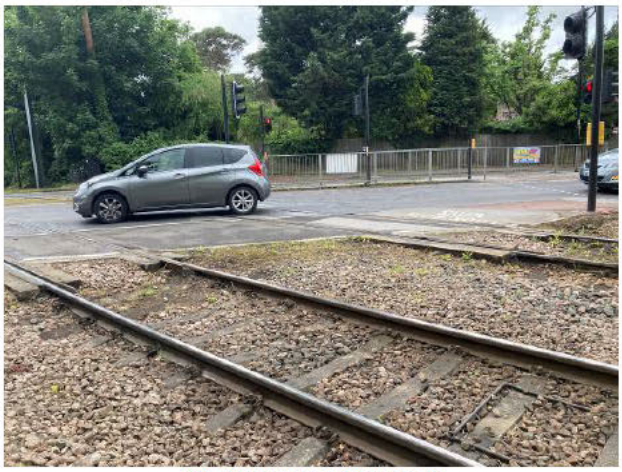
DRAINAGE	The current configuration does not allow adequate drainage of water from the road which currently runs off into the ballast and has resulted in contaminated ballast, especially at the east side of the crossing.

	 The new design and installation shall include provision of a new drainage system that will collect all water running off from the road. There is not an active track drainage system in the proximity of the road crossing, the closest catchpits are approx. 250 from the renewal limits. For more details of the location, see as built drawings: • 96434B/15/A/23060_Oaks Road to Kent Gateway. Plan of Civils Works and Cross Section • Gravel Hill track renewal: P15007-ARC-LT107-DR-C-0001_ Z01 (AS BUILT)_Modern_Road_Revised_Final_As_Built
POWER AND OVERHEAD LINE EQUIPMENT	Survey to be undertaken of the OLE heights and staggers. Any heights and staggers that, after completion of the works, do not meet the requirements of LT-IMS-ENG-2004 shall be adjusted by a competent person. Sufficient protection of the OHLE shall be implemented during the works. Survey shall be also included the negative bonding of the track, in the 4 foot of track negative bonding, between EB and WB tracks and bonding connexions at insulator track joints. All Power and OHLE equipment and track bonding, shall be reinstated in its current location unless stated otherwise by the LT Power Engineer. *Note: Temporary design work and OHLE monitoring shall be considered if any works are done in the proximity of the OHLE foundations which affect the OHLE stability.

STANDARDS	
London Trams Applicable Standards	Track Standards: LT-IMS-ENG-560_Track Performance and Configuration LT-IMS-ENG-561_Track Alignment and Design LT-IMS-ENG-562_Track Inspection and Maintenance LT-IMS-ENG-511 - Track - Prevention of Buckling Track Procedures: LT-IMS-ENG-510 - Track - Rail Stressing Procedure LT-IMS-ENG-510B - Track - Stressing Method Matrix LT-IMS-ENG-510C - Track – Side Roller Frequency Matric LT-IMS-ENG-2050 - On-Track-Plant Acceptance Civils Standards LT-IMS-ENG-960 Standard for Civils Inspection and Maintenance LT-IMS-ENG-961 Standard for Lineside Environment LT-IMS-ENG-962 Standard for Drainage LT-IMS-ENG-963 Standard for Civils Structures LT-IMS-ENG-964 Standard for Buildings, Premises and Tramstops OLE standards: LT-IMS-ENG-764_OLE Performance, Alignment and Configuration LT-IMS-ENG-763_OLE Inspection and Maintenance LT-IMS-ENG-701 - OLE Inspection Maintenance Procedure Systems Standards LT-IMS-ENG-660 Standard for Signalling Systems LT-IMS-ENG-661 Standard for Systems Inspection and Maintenance Interfaces and Third-party Standards LT-IMS-ENG-860 Standard for Tram Clearances (Tram-Infrastructure Interface) LT-IMS-ENG-861 Standard for Wheel Rail Interface Management LT-IMS-ENG-862 Standard for Track Highways Interface Management LT-IMS-ENG-863 Standard for Tram-Power Interface Management LT-IMS-ENG-864 Standard for Tram-Signalling and Communications Interface All drawings, design and as-builts, shall be provided in CAD format complying with LT-IMS-ENG-070 Computer Aided Design (CAD). The design and installation shall comply with the London Trams Standards. In the absence of any relevant London Tram standards, London Underground standards will be referred. If there is still no applicable standard or ambiguity, the designer or contractor should contact the LT Asset Engineers for clarification.

PHOTOGRAPHS OF EXISTING ROAD CROSSING

Ch 04,xxx Looking West



Ch 04,xxx Looking East

Ch 04,600 Looking East

Ch 04,610

Ch 04,610 Looking East

Ch 04,630 Looking West

Ch 04,630m Looking West

Ch 04,620m Looking East

SPEED BOARD LOCATIONS

WB

Speed (Kph)	Board Location / Post	
20	Before Signal Approaching Coombe Lane	Mast OA 04 643
50	East of Lower Addiscombe Rd	Mast OA 04 514

EB

Speed (Kph)	Board Location / Mast	
20	West of Shirley Hills Intersection	Mast OA 04 575
70	East of Shirley Hills Intersection	Mast OA 04 698

Attachment 2 - Consultant's Proposal

Attachment 3 – Tender Queries and Assumptions Log

Attachment 4 - Consultant's Pricing Schedule

Attachment 5 – Proposed Programme v4.0

Intentionally Blank