



C3: Scope of Services

C3.1 Scope Information

The following abbreviations may be used in this document, and have the meaning as indicated:-

-	DTM	=	Digital Terrain Model
-	MSL	=	Mean Sea Level
-	SRJ	=	Stock Rail Joint (of turnouts)
-	ETO	=	End of Turnout
-	ES	=	End of Set (or turnout)
-	OHTE	=	Overhead Track Equipment
-	C/M	=	Clearance marker
-	WGS	=	World Geodetic System
-	CAD	=	Computer Aided Design

A standard set of symbols to be used for indicating the different surveyed points on the as-is drawings should be provided in an Annexure.

The way in which, (as well as which geometric points of), top of rails, turnouts (sets of points and crossings), important land marks, and any other feature on the site required by the design engineer to be shown, are to be drawn on the as-is drawings.

A feature definitions list and field codes for survey points should clearly be defined. If a feature is identified onsite but it is not in provided feature definitions list known by the service provider, it must be communicated to the client representative and included on the returnable list of feature definitions and given a feature name and field code.

1. Description of the Services

The *Services* is to complete a topographical survey for the **various sites affected by the floods in the greater Durban area** as highlighted on the site information sheet (Part 4, C4.1). The *Services* covers the general survey of the site and any other work arising out of or incidental from the *Services* or required of the *Consultant* for proper completion of the work in accordance with the true meaning and intent of the contract document and includes the following:

- a) The survey of railway lines, structures, services, buildings, roads, electrical and signalling cables and markers, storm water drains, rock outcrops and cuttings, culverts, embankments, fences and any other feature in the vicinity of the site required by the client to be covered.
- b) Establish permanent and temporary bench mark positions.
- c) Provision of all survey information should be supplied on a magnetic medium in a format assessable by Microstation and AutoCAD.
- d) Survey work which could be expected of a **qualified** surveyor that is professionally registered.



2. Drawings and Photographs

2.1 The service provider can make use of drawings and drawing overlays to depict any information that the *Consultant* may depict over and above the assessable by Microstation and AutoCAD.

3. Specifications

3.1 Applicable Standard Specifications

There are no technical specifications applicable.

3.2 Applicable Generic Specifications

Transnet E7/1 (July 1998): Specification for works on, over, under or adjacent to railway lines and near high voltage equipment.

3.3 The *Consultant* must make sure that he obtains an access certificate and together with his personnel comply to any safety requirements imposed by Transnet Freight Rail and as arranged by the Employer's Agent

4. Constraints on how the *Consultant* Provides the Services

4.1 Requirements for Equipment (Refer to SANS 1921-1 clause 4.13)

- The requirements for equipment to be used near high voltage equipment are provided in the Generic specification, E7/1.
- The *Consultant* shall use a non-conductive (wood or plastic) mechanism, to accurately determine the centre line and level of railway track survey points.
- The design of such a mechanism shall be submitted to the **Employers Agent for approval** before the *Consultant* first establishes on site.

4.2 Format of information to be provided

4.2.1 The survey information shall be supplied in a digital format (assessable on Microstation, AutoCAD and Open Rail Designer).

4.2.2 The DTM data shall be in an ASCII, TOT and RW5 format, supplied on a virus free compact disc and readable by the software programme CIVIL DESIGNER and BENTLEY OPEN RAIL DESIGNER

4.2.1 All annotations on the plan shall be in English.

4.2.2 The plan shall be orientated with north at the top of the drawing.

4.2.3 **Levels** shall be displayed with a point as the **decimal point** and this point shall be placed at the centre of the level and must **correspond with the survey shot**.

4.2.4 **Levels** shall be indicated with **2 digits before the decimal point and 2 digits** after the decimal point, with lettering not less than 2.5mm high, in Arial font. The level shall be one text line.



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4.2.5 To prevent cluttering of the as-is drawings, when plotting these levels the *Consultant* shall ensure that they are spaced not closer than **1mm apart (at a 1:500 scale)**, and that the numerals indicating the levels do not **overlap**.

4.2.6 Levels and descriptions of the level shall be on separate CAD layers.

4.2.7 Contours generated from the survey must accurately reflect the ground levels. The height intervals shall depend on site conditions and on the scale of the drawing. Where practical 0,5m contours shall be shown, but the space between plotted contours on the plan shall not be less than 5mm. Rail levels must not be considered when generating ground contours.

4.2.8 Co-ordinates system and datum level

- All co-ordinates shall be based upon the WGS system.
- The datum for levels shall be MSL.

4.2.9 Information to be recorded

- The Consultant shall record all local topography on a grid of not more than 20m x 20m.
- Spot heights shall indicate the crests of hills and bottom of valleys and depressions. Sufficient spot heights need to be provided to indicate ground variations, which cannot be adequately expressed by contour lines. Storm water trenches, streams and berms need to be located and shown clearly.
- Rail survey shots to be recorded on a separate layers for the left, right and centre of track and to be positioned on the left, right and centre line of track at the exact position the shot was taken.
- Cant must also be recorded and provided on a separate layer.
- Control points must be recorded on a separate layer on the drawing.
- **Levels of control points** shall be indicated with 4 **digits before the decimal point and 2 digits** after the decimal point, with lettering not less than 2.5mm high, in Arial font. The level shall be one text line.

4.2.10 In addition to the above, the following features shall also be surveyed, if encountered:

- Railway related infrastructure
 - **Track centreline** positions at 10m intervals.
 - Turnouts (**centre line of track**) at SRJ, ETO, and ES, as well as the centreline of the C/M. (The Consultant will be furnished with a drawing indicating the method to determine these points on site, if they are not clearly visible).
 - All grade posts adjacent to the track, also recording the markings on it reflecting the grade in both directions
 - All kilometre posts, also recording the markings on it reflecting the distances.
 - All curve data markers placed along the track, also recording the markings on it showing the beginning and end of transition and circular curves. (The Consultant will be furnished with a rail track data indicating the radii of these points on site, if they are not specified on site).
 - All curve radii are to be represented as **curves and not cords**. Note the beginning of the curve, end of curve and radii of curves needs to be indicated on the survey.
 - Centreline of All OHTE masts (when there are such masts) with the level on the ground, as well as any other equipment on the ground, also recording the markings / numbering on it
 - Ditto for all signal masts and electrical boxes, also recording the markings/numbering on it
 - Top and bottom of **rails, sleepers, ballast** positions at 10m intervals on each track.
- Telephones, power lines and electrification where applicable
 - Telephone poles and routes
 - Power poles and routes
 - Transmission lines
 - Surface cables and cable markers, also recording the markings / numbering on it
 - Yard Area lighting
 - Transformers and sub-stations
- Structures and buildings where applicable



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- Edge of platforms – where applicable
 - Culverts, also recording the size of opening, length, and invert levels– where applicable
 - Bridge structures and retaining walls– where applicable
 - Buildings derelict buildings and quarters– where applicable
 - Water tower
 - Manholes – both cover and invert levels and recording the type of manhole. Invert levels shall clearly be marked as either pipe invert levels or manhole invert level
 - Fire hydrants and water taps
 - Miscellaneous features
 - Subway and subway invert levels shall clearly be marked
 - Markers for pipes / cables also recording the markings / numbering on it
- Roads, fences and other features
 - Footpaths and roads, showing kerbs, gutters, catch pits, type of road surface, width of premix and concrete surfaces with the relevant invert levels clearly marked as for Structures and buildings above
 - Fencing, stating the type of fence
 - Eroded areas, gullies and streams
 - The existing municipal water supply pipe must be identified and its details must be provided where applicable.
 - Existing underground water network must be identified and its details must be provided where applicable.
 - Existing underground services must be identified and their details must be provided where applicable.
 - A high definition, coordinated (WGS) raster image of the survey area must be provided where applicable.

4.3 Control points

- 4.3.1 The Consultant shall make use of new **control points** and pick up all **existing** control points if any.
- 4.3.2 The Consultant shall provide a list showing the co-ordinates and elevation of each control point and survey station
- 4.3.3 The new control points shall be inter-visible and not more than 50m apart.
- 4.3.4 As a general rule, control points shall be placed on the periphery of the area to be surveyed, within the Railway reserve and so spaced that a network of further control points can be established if required.
- 4.3.5 Control points shall be located in such a position as to minimise the likelihood of disturbance or damage
- 4.3.6 The Consultant and the Employees Agent shall agree on the minimum envisaged number of control points required for the survey.
- 4.3.7 The control points shall be Y-standard driven into the ground leaving at least 20mm protruding, which must be encased in concrete of at least $\Phi 200\text{mm}$ and 100mm deep, or any other method which will protect these points permanently, as agreed between the Consultant and the Employers Agent.
- 4.3.8 Each control point shall be provided with a metal tag set into the ground indicating its number.
- 4.3.9 Each control point shall have its own **photograph accompanied** with the survey.



4.4 Accurate Measurements Tolerances

- 4.4.1 The accuracy of the contours generated from Civil Designer (software program to be used) must be such that upon comparison with the results of a selective check survey, the surveyed elevations of at least 90% of the points checked do not differ from their elevation as interpolated from the contours by more than half of the contour interval, and not more than 1% differ by more than the contour interval. The check shots shall be placed at random and shall be sufficient in number for the size of the area being surveyed.
- 4.4.1 Spot heights shall be accurate to $\pm 20\text{mm}$.
- 4.4.2 Centre line of track position shall be accurate to $\pm 50\text{ mm}$ and rail levels to $\pm 10\text{mm}$.
- 4.4.3 Invert levels of culverts and manholes shall be accurate to $\pm 10\text{mm}$.

4.5 Integrity of Results

- 4.5.1 Testing
- 4.5.1 The Consultant shall ensure, by means of field checks or other independent confirmations, that the services complies with the specified standards and shall furnish proof, if required by the Employers Agent, that drawings depict details correctly.
- 4.5.2 The Employers Agent will scrutinise and check the fieldwork, calculations, drawings, and records to such an extent as he may deem necessary in order to satisfy himself that the terms of the contract and specification are met and complied with.

4.6 Deliverables

4.6.1 DTM Survey: Civil Designer format

Survey data shall be submitted on a CD as a "Civil Designer format" and "Bentley Open Rail Designer" or equivalent files that can be used in "Civil Designer" and "Bentley Open Rail Designer" and must include, all break lines, survey points, triangles and contours.

The centre of both left and right rails must be represented on the DTM with its super elevation on a separate surface.

Triangulation of break lines must create the actual representation of the topography of the land when longitudinal sections and cross sections are extracted.

Survey data shall be submitted on a CD in a RW5, 3D (.DGN), (.DWG), (.TOT) file formats or equivalent that can be used in "Bentley Open Rail Designer" and "Civil Designer" and must include, all break lines, survey points, triangles and contours.

The DTM must be in a LandXML format that is triangulated. The triangulations must be in 3D and in a DWG/ DGN format or equivalent.

The surface features and contours must be in 3d polylines in DWG/DGN format.



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4.6.2 Survey Mapping

Survey mapping shall be provided in the form of hard copies to a scale of 1:500 as well as a magnetic medium in a format assessable by Microstation and AutoCAD (.dwg and/or .dxf format) on a CD.

4.6.3 Tabulation of survey data in Excel and ASCII format

4.6.4 A list of the permanent / temporary survey beacons (bench marks) used for undertaking the services. This list must also be indicated on the Drawing.

4.6.5 List of Codes:

A list showing all descriptions of survey codes used.

4.6.6 Photographs and videos of the site in general must be provided in a digital format.

4.6.7 A walk-through digital video recording of the site in general must also be provided.

4.7 Clarification meeting

4.7.1 The appointed consultant must be available for a clarification meeting either at the office or on site after the contract is awarded. The surveyor and the draft person must be available for this meeting.

5. Services and other things provided by the *Employer*

The *Employer* will not provide any plant, equipment or material.

There will be no other activities on site that will interfere with the execution of the requirements of this task other than train operational activities. In this regard the *Consultant* shall acquaint himself of and abide by the requirements of specification: Transnet E7/1 (July 1998) Specification for works on, over, under or adjacent to railway lines and near high voltage equipment.

6. Health and Safety

Prepare and submit for approval a Health and Safety file in terms of Transnet's Health and Safety requirements for *Consultants* working on Transnet property. In terms of this file, the successful Tenderer will be responsible for the implementation of the obligations contained in Health and Safety file.

The successful Tenderer must prepare and submit for approval a Health and Safety file in terms of Transnet's Health and Safety requirements for *Consultants* working on Transnet property. In terms of this file, the successful Tenderer will be responsible for the implementation of the obligations contained in Health and Safety file. A copy of the file will be kept by TGC and be available on site. There are requirements of the *Consultant* in terms of Health and Safety. These are described below:

- Legal Appointments and proof of competencies for the Delegated Authority 16(2), Construction supervisor 6(1), Construction safety officer 6(6) or SHE Rep 17(1) and First Aider (Trained).
- First Aid Box with all the required contents.
- Valid letter of good standing for the *Consultant*, a copy of WCL2 form and ID copies for all on site.
- Safety Daily task Instruction (Safety Talk) to be done daily before work commences.
- Health & Safety Plan for the *Consultant* correlating with TGC Health & Safety Specification.
- Organogram of supporting structure (this document must provide all persons appointed in terms of the OHS Act 85 of 1993).
- Baseline Risk Assessment with all the activities that will be performed on site.
- Method statement for the tasks.
- Safe work procedure for the tasks.



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- Proof that issue register system in place for P.P.E.
- Valid medical certificates of fitness done by an Occupational Health Practitioner for all on site.
- Proof of induction training received.
- Section 37(2) mandatory agreement between Client – *Consultant* and *Consultant* – Sub contractor.
- Proof of alcohol testing register of all on site daily done by the trained person.

The above-mentioned points are the minimum safety requirements.

7. Procurement

7.1 Code of Conduct

Transnet aims to achieve the best value for money when buying or selling goods and obtaining services. This however must be done in an open and fair manner that supports and drives a competitive economy. Underpinning our process are several acts and policies that any supplier dealing with Transnet must understand and support. These are:

- The Transnet Detailed Procurement Procedure (DPP);
- Section 217 of the Constitution - the five pillars of Public PSCM (Procurement and Supply Chain Management): fair, equitable, transparent, competitive and cost effective;
- The Public Finance Management Act (PFMA);
- The Broad Based Black Economic Empowerment Act (BBBEE); and
- The Anti Corruption Act.

This code of conduct has been included in this contract to formally apprise Transnet Suppliers of Transnet's expectations regarding behaviour and conduct of its Suppliers.

Prohibition of Bribes, Kickbacks, Unlawful Payments, and Other Corrupt Practices

Transnet is in the process of transforming itself into a self-sustaining State-Owned Enterprise, actively competing in the logistics industry. Our aim is to become a world class, profitable, logistics organisation. As such, our transformation is focused on adopting a performance culture and to adopt behaviours that will enable this transformation.

1 Transnet will not participate in corrupt practices and therefore expects its suppliers to act in a similar manner.

- Transnet and its employees will follow the laws of this country and keep accurate business records that reflect actual transactions with and payments to our suppliers.
- Employees must not accept or request money or anything of value, directly or indirectly, to:
 - Illegally influence their judgement or conduct or to ensure the desired outcome of a sourcing activity;
 - Win or retain business or to influence any act or decision of any decision stakeholders involved in sourcing decisions; or
 - Gain an improper advantage.
- There may be times when a supplier is confronted with fraudulent or corrupt behaviour of Transnet employees. We expect our Suppliers to use our "Tip-offs Anonymous" Hot line to report these acts. (0800 003 056).

2. Transnet is firmly committed to the ideas of free and competitive enterprise.

- Suppliers are expected to comply with all applicable laws and regulations regarding fair competition and antitrust.
- Transnet does not engage with non-value adding agents or representatives solely for the purpose of increasing BBBEE spend (fronting)



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3. *Transnet's relationship with suppliers requires us to clearly define requirements, exchange information and share mutual benefits.*

- Generally, Suppliers have their own business standards and regulations. Although Transnet cannot control the actions of our suppliers, we will not tolerate any illegal activities. These include, but are not limited to:
 - Misrepresentation of their product (origin of manufacture, specifications, intellectual property rights, etc);
 - Collusion;
 - Failure to disclose accurate information required during the sourcing activity (ownership, financial situation, BBBEE status, etc.);
 - Corrupt activities listed above; and
 - Harassment, intimidation or other aggressive actions towards Transnet employees.
- Suppliers must be evaluated and approved before any materials, components, products or services are purchased from them. Rigorous due diligence is conducted and the supplier is expected to participate in an honest and straight forward manner.
- Suppliers must record and report facts accurately, honestly and objectively. Financial records must be accurate in all material respects.

Conflicts of Interest

1. *A conflict of interest arises when personal interests or activities influence (or appear to influence) the ability to act in the best interests of Transnet.*
 - Doing business with family members
 - Having a financial interest in another company in our industry

7.2 The Consultant's Invoices

7.2.1 When the *Employer's Agent* certifies payment (see Clause 50) following an assessment date, the *Consultant* complies with the *Employer's* procedure for invoice submission.

7.2.2 The invoice must correspond to the *Employer's Agent's* assessment of the amount due to the *Consultant* as stated in the payment certificate.

7.2.3 The invoice states the following:

- Invoice addressed to Transnet Limited;
- Transnet Limited's VAT No:
- Invoice number;
- The *Consultant's* VAT Number; and
- The Contract number:

7.2.4 The invoice contains the supporting detail.

7.2.5 The invoice is presented either by post or by hand delivery.

7.2.6 Invoices must be submitted by email to the *Employer's Agent*:

7.2.8 The invoice is presented as an original.