

**NATIONAL GRID ELECTRICITY TRANSMISSION**

**Plc**

**NGET GENERIC WORKS INFORMATION**

**September 2017**

**VERSION 1.0**

## Table of Contents

1	Introduction .....	9
1.1	Description of the Works .....	9
2	General Constraints on how the <i>Contractor</i> provides the Works .....	11
2.1	Access to Site .....	11
2.2	Principal Consents .....	11
2.3	Secondary Consents .....	11
2.4	Access and Egress .....	13
2.4.1	Provision of Roadways .....	15
2.5	Consideration of Others .....	15
2.6	Working Hours .....	15
2.6.1	Working Hours Specific to OHL Works .....	15
2.7	Occupied Premises and Users .....	16
2.8	Pollution, Ecological, Archaeological or Environmental Impacts .....	16
2.8.1	Minimising Agricultural Impacts .....	16
2.8.2	Minimising Land and/or Crop Damage .....	16
2.8.3	Minimising Animal Disease .....	16
3	Programme / Project Controls .....	18
4	Design Management .....	19
4.1	Design Responsibility .....	19
4.2	<i>Employer's</i> Design Requirements .....	19
4.2.1	<i>DESIGN SPECIFICATIONS</i> .....	19
4.2.1.1	<i>CONTRACTOR'S DETAILED DESIGN</i> .....	20
4.2.2	<i>CONSTRUCTION DESIGN SPECIFICATION: SUBSTATION (CDS-SUBS)</i> .....	20
4.2.3	<i>CONSTRUCTION DESIGN SPECIFICATION: PROTECTION, CONTROL AND TELECOMS (CDS-PCT)</i> .....	20
4.2.4	<i>CONSTRUCTION DESIGN SPECIFICATION: CIVIL (CDS-CIV)</i> .....	20
4.2.5	<i>CONSTRUCTION DESIGN SPECIFICATION: OVERHEAD LINES (CDS-OHL)</i> .....	20

4.2.6 CONSTRUCTION DESIGN SPECIFICATION: CABLE (CDS-CAB).....	20
4.3 Design Submission Procedures.....	20
4.3.1 Design Delivery Programme.....	20
4.3.2 Design Compliance Audits.....	21
4.3.2.1 DESIGN COMPLIANCE AUDIT – SATISFACTORY OUTCOME.....	21
4.3.2.2 DESIGN COMPLIANCE AUDIT – UNSATISFACTORY OUTCOME .....	21
4.3.3 DESIGN RE-SUBMISSIONS .....	21
4.4 Design Coordination .....	21
4.5 Requirements of Others .....	22
4.6 Design Approval from Others .....	22
4.7 Emergency Return to Service (ERTS) Requirements Strategy .....	22
5 Employer’s Work Specification and Drawings.....	23
5.1 Applicable Standards .....	23
Technical Specifications (TS/NGTS).....	23
Transmission Procedures (TP) .....	23
Design Handbooks (DH).....	23
Commissioning Handbooks (CH).....	23
Site Commissioning Test Schedules (SCT) .....	23
National Grid Safety, Health and Environmental (SHE) Procedures.....	24
Safety Rules and National Safety Instructions (NSI).....	24
Technical Guidance Notes (TGN) .....	24
Other Documents .....	24
Type Registration.....	24
5.2 Drawings .....	24
6 Working with the Employer and Others .....	26
6.1 Sharing the work area with the Employer and Others .....	26
6.1.1 Authorities and Utilities Providers .....	26

7	Management of the Works .....	27
7.1	Contractor's Project Resources .....	27
7.1.1	PROJECT COMMISSIONING RESOURCE .....	28
7.1.2	PROJECT TEMPORARY WORKS COORDINATOR .....	28
7.2	Contractor Procurement .....	28
7.3	Site Establishment / Contractor's and Employer's Accommodation .....	29
7.3.1	SITE ESTABLISHMENT PLAN .....	29
7.4	Contractor's Site Emergency Plan .....	30
7.5	Security .....	30
7.5.1	PROTECTION OF THE SITE .....	31
7.5.2	IDENTIFICATION OF PEOPLE .....	31
7.5.3	Control of Site Personnel .....	31
7.6	Contractor's Traffic Management Plan .....	32
7.7	Site Cleanliness .....	32
7.9	HAZARD REGISTER/RISK MANAGEMENT .....	33
7.10	Reporting and Documentation .....	33
7.10.1	General .....	33
7.10.2	Contract Status Report .....	34
7.10.3	Photographic Records .....	35
7.10.4	Installation, Operation and Maintenance Documentation (IOM) .....	36
7.10.5	Asset Technical Data and Financial Reporting .....	37
7.10.6	Project Handover Documentation .....	38
7.10.6.1	Additional Requirements for Final Records .....	38
	OHL ROUTE MAPS .....	38
	OHL LINE SCHEDULE(S) .....	38
	OHL PROFILE DRAWINGS .....	39
7.10.6.2	HEALTH AND SAFETY (H&S) FILE INFORMATION .....	41
7.11	Meetings .....	41

7.11.1	Pre-Construction Information (PCI) Review and Principal Designer (PD) Handover Meeting	41
7.11.2	Pre Site Start Meeting.....	41
7.11.3	Site (Weekly) Safety, Health, Environment, Security, Quality & Programme (SHESQ&P) Meeting	42
7.11.4	Contract Progress Meetings.....	42
7.11.5	Design Review & Hazard Review Meetings .....	42
7.11.6	Commissioning Panel Meetings.....	42
7.11.7	UKBP/TP153 Co-ordination Meetings.....	42
7.11.8	Post Project Review Meeting.....	42
7.11.9	Other Meetings.....	42
	<i>INAUGURAL CONTRACT MEETING .....</i>	<i>42</i>
	<i>COMMERCIAL MEETINGS .....</i>	<i>43</i>
	<i>THIRD PARTY LIAISON MEETINGS .....</i>	<i>43</i>
8	Health, Safety, Environmental and Sustainability .....	44
8.1	General Requirements .....	44
8.1.1	Safety Leadership.....	45
8.1.2	Communication and Consultation.....	46
8.1.3	Health, Safety and Environment Notice Boards .....	46
8.1.4	<i>Employer's</i> Safety Communication.....	46
8.2	SHE Management Plans .....	47
8.2.1	Health and Safety Handover Records .....	48
8.2.2	Environmental Handover Records.....	48
8.3	Method statement, Risk Assessments and Safe Systems of Work .....	49
8.3.1	<i>Contractor's</i> Work Permit Management Systems.....	50
8.3.2	The use of Radio Detection Cable Avoidance Tool .....	51
8.3.3	Excavations.....	52
8.4	Training and Competency .....	52
8.4.1	Training and Competency of the <i>Employer's</i> Staff .....	53

8.5 Hazardous Substances and Occupational Health .....	53
8.6 Sensible Monitoring Site Inspections and Audits .....	54
8.7 Personal Protective Equipment.....	55
8.8 Incident Reporting.....	55
8.9 SF <sub>6</sub> Gas Usage and Leakage .....	56
8.10 Sustainability .....	56
8.10.1 Sustainability Review and Good Practice.....	57
8.10.2 Mandatory practice .....	58
8.10.3 Carbon Management.....	58
8.10.4 Management of Waste and Resources.....	58
8.11 Nuisance .....	59
8.12 Water Management .....	60
8.13 Contaminated Land .....	60
8.14 Concrete .....	60
8.15 Refuelling .....	61
8.16 Pollution Prevention.....	62
9 CDM.....	63
10 Quality Management.....	64
10.1 <i>Employer's</i> Requirements .....	64
10.2 Quality Plans .....	64
10.2.1 Contract Quality Plan.....	65
10.2.2 Project Quality Plan.....	66
10.2.2.1 <i>KEY ELEMENTS FOR THE CONTRACTOR'S PROJECT QUALITY PLAN</i> .....	66
10.2.3 Designer's Quality Plan.....	70
10.2.3.1 <i>KEY ELEMENTS FOR THE DESIGNER'S QUALITY PLAN</i> .....	70
10.2.4 Site Quality Plan.....	71
10.2.5 Site Inspection and Test Plans.....	74

10.2.5.1 CHECK SHEETS, TECHNICAL REPORTS, TECHNICAL RECORDS ETC.....	75
10.2.6 Subcontractor/Supplier Quality Plans .....	76
10.2.7 Contractor's Manufacturing Assurance.....	76
10.2.7.1 MANUFACTURING QUALITY ASSURANCE INSPECTION REPORTS .....	77
10.2.7.2 MANUFACTURER/SUPPLIER'S CERTIFICATE OF CONFORMITY.....	77
10.2.7.3 PROJECT MANAGER'S MANUFACTURING QUALITY ASSURANCE AUDITS.....	77
10.3 Quality Audits .....	77
10.4 Inspection by the <i>Employer</i> .....	78
10.5 Inspection by the <i>Contractor</i> .....	78
10.6 Quality Documentation .....	78
10.7 Site defects and Non-Conformance during the Works .....	78
10.7.1 Defects .....	78
10.7.2 Non-Conformance Reporting.....	79
11 Commissioning .....	80
11.1 Tests and Inspections.....	80
11.1.1 Commissioning Programme.....	80
11.1.2 Commissioning Risk Assessment and Method Statements .....	81
11.1.3 Acceptance Testing Requirements.....	81
11.1.4 Acceptance Testing Resources .....	81
11.1.5 Commissioning File.....	81
11.2 Management of Tests and Inspections .....	82
11.3 Covering up Completed Work.....	82
11.4 Type Registration.....	82
12 Other Requirements .....	84
12.1 Software Provision .....	84
12.2 Accounts and Records .....	84
13 Completion .....	85

13.1 Introduction .....	85
13.2 Pre-completion arrangements .....	85
13.3 Take Over .....	85
13.3.1 Technical Completion Statement.....	85
13.3.2 Completion Certificate .....	85
Appendices .....	86
Amendment Record .....	87



## 1 Introduction

This Works Information document contains information, of a commercial and technical nature, relating to all National Grid Electricity Transmission Projects, which shall be read in conjunction with the Works Information Project Specific document.

The *Employer* reserves the right to amend the enclosed information if it considers it necessary or prudent to do so regarding a particular Project. This shall not prejudice the *Employer's* rights or duties in respect to any current Projects nor shall it be taken as an indication of the *Employer's* future intentions, unless otherwise stated.

Defined terms used in this document are identified as follows:

- Contract Data (in italics): *Employer, Contractor, Project Manager, Supervisor*
- ECC terms (Capital Initials): Plant, Equipment, Site, Working Area etc.
- **Note:** National Grid **Safety Rules** and Guidance document contains defined terms in bold text for example **System, Equipment and Danger, Senior Authorised Person** in the definitions section (D).

### 1.1 Description of the Works

The Works are to be provided by the *Contractor* as detailed within the Project Specific Works Information and in compliance with the *Employer's* Work Specifications and Drawings.

The Works shall fulfil, but not be limited to, the following requirements:

- Deliver a design to meet the System Design requirements stated in the Project Specific Works Information,
- Meet the overall project timescales, programme requirements and system outage requirements,
- Deliver the project safely and efficiently,
- Provide sufficient and suitable resources to fulfil the Works in the required programme timescales,
- Provide and deliver the required Plant and Materials,
- Meet the *Employer's* specific design specifications and policies for equipment connected to the National Grid system to comply with the National Grid Transmission Licence and Grid Code,
- Preserve and/or enhance the environment affected by the Works,
- Utilise principles of Value Engineering and sustainability,
- Maintain good relations with the general public and grantors who may be affected by the Works,
- Comply with the current requirements of UK Legislation including Construction (Design and Management) Regulations (CDM),
- Comply with specific planning, highways and other statutory obligations,
- Provide Plant and Materials as far as possible that shall be maintenance free and only require periodic condition checks to establish its level of integrity and safety for continued service between checks,

- Plant and Materials shall provide safe systems to permit maintenance and repair access during system outages complying with the National Grid Electricity Transmission **Safety Rules** and relevant National Safety Instructions (NSIs),
- Plant and Materials shall have comprehensive quality assurance and quality control processes in place and that these processes identify the requirements for inspection and testing and how these are recorded with regard to traceability to the relevant National and International Standards. There should be sufficient routine surveillance, acceptance tests and other documentary records to demonstrate fitness for purpose throughout manufacture and installation,
- Provide a High Voltage system or parts thereof, that is designed and installed in such a way that minimises system losses, and
- Provide an Overhead Line System/s that is designed and installed in such a way that minimises audible noise, visible corona and Electro-magnetic Fields, (OHL Specific).

## **2 General Constraints on how the *Contractor* provides the Works**

The *Employer* is committed to a policy of equality of opportunity in their employment practices. All organisations working for, or on behalf of, National Grid are expected to be able to demonstrate a clear commitment to the policy that no employee or job applicant is treated less fairly because of their gender, race (including colour, nationality, ethnic or national origin), religion, marital status, disability, age, sexual orientation or other condition not justified in law and relevant to the performance of the job.

### **2.1 Access to Site**

To facilitate the Works, the *Contractor* might be required to access their point of work on land owned, and operated, by third party land owners as well as National Grid owned and operated sites/land. The *Contractor* must understand that although the *Employer* and their appointed contractors have a right of access under the terms of the Wayleave or easement, the land owners may refuse access if they are not satisfied with access or work arrangements. The *Contractor* shall therefore arrange and execute the Works with this in mind, and ensure impacts are communicated and access arrangements are mutually acceptable prior to any work activity.

### **2.2 Primary Consents**

Principal, primary consents are those relating to assets that will be retained permanently as National Grid's property. The *Employer* shall be responsible for obtaining all primary consents and licenses, including the following (where applicable):-

- (a) Notification to the local planning authority where Works are deemed to be permitted development,
- (b) Planning permissions (including permanent access onto a public maintainable road),
- (c) Development Consents Orders (DCO) and section 37 consent for overhead lines and associated works including any prior approval notification,
- (d) Environmental Impact Assessment (EIA) screening/scoping and preparation of the Environmental Statement (ES) for all development,
- (e) Compliance with any specific requirements and actions agreed as part of the initial Development Consent Order (DCO) and Section 37 consent as identified within the project specific works information document,
- (f) Consent to work in a Site of Special Scientific Interest (SSSI), including an SSSI that is also a Special Area of Conservation, Special Protection Areas or sites listed on the RAMSAR wetlands of International importance and
- (g) Land acquisition, Wayleaves and/or easements for site access (Land Rights).

The *Contractor* shall be responsible for complying with, and where necessary providing information in connection with the discharge of, all environmental and planning conditions attached to the primary consents.

### **2.3 Secondary Consents**

Secondary consents and licenses are those relating to the construction and post construction phases (including the operation of the asset). The scale and impact of matters will determine whether the *Employer* or the *Contractor* is responsible for securing secondary consents and licenses and this

information will be set out in the Project Specific Works Information. In the first instance the *Employer* shall be responsible for securing the following secondary consents and licenses (where applicable, but not limited to):-

- (a) Closure and diversion of Public Rights of Way (PRoW);
- (b) Listed Building Consent/Conservation Area Consent;
- (c) Scheduled Ancient Monument Consent Works affecting an area of archaeological importance;
- (d) Port authority consultations and all consents / licences required by the Marine Management Organisation (MMO);
- (e) Environment Agency (EA) consents;
- (f) Requirements as defined by Natural England or Natural Resources Wales including License to affect or translocation of protected species or habitats.

In the first instance the *Contractor* shall be responsible for securing the following secondary consents and licenses including (where applicable, but not limited to):-

- (a) License to affect protected hedgerows or trees with Tree Preservation Orders (TPO's),
- (b) License which will affect a burial ground,
- (c) Consent to discharge waste water to a watercourse or sewer,
- (d) Abstraction license,
- (e) Works in proximity of main river/land drainage/flood defence consent,
- (f) Consent to use pesticide in close proximity to a watercourse,
- (g) Installation of water filtering,
- (h) Discharge of type I or II listed dangerous substance/groundwater regulations, and
- (i) Closure and diversion of roads (including trunk roads and motorways).

The following secondary consents and licenses are the responsibility of the *Contractor* including, but not limited to, the following (where applicable):-

- (a) Prescribed processes,
- (b) Section 61 consent (noise/vibration),
- (c) Waste management licenses,
- (d) Waste exemptions,
- (e) Hazardous waste producer,
- (f) Control/removal of invasive species,
- (g) Felling licenses,
- (h) License for removing human remains,
- (i) License for the use and storage of radioactive sources,
- (j) Considerate constructors' scheme and
- (k) Notification of removal of water from excavations.

Notwithstanding the guidance above, the *Contractor* shall agree in advance with the *Employer* the strategy for identifying and obtaining all secondary consents. The *Contractor* shall identify the person(s) within the project team responsible for obtaining them. For projects involving Distribution Network Operators (DNO's) the *Contractor* shall negotiate directly with the appropriate DNO to obtain any required secondary consents for these elements of the Works and include for all costs associated with this. For the avoidance of doubt, the *Contractor* shall keep the *Project Manager* informed of the progress of these negotiations and expected costs.

National Grid's Land Officers shall work in conjunction with the *Contractor* to assist with negotiation with third party land owners, grantors etc. For land access further details will be provided in the Project Specific Works Information.

The *Contractor* shall not be involved in financial negotiation with landowners but shall be required to assist in defining, discussing and agreeing the local requirements for facilitating the Works. The *Contractor* shall not negotiate directly with third parties on these matters, but shall assist National Grid's Land Officers and/or the *Project Manager* with regard to detailing requirements to progress the Works.

The *Contractor's* Environmental Representative shall work with the *Employer's* Land and Consents departments to facilitate this deliverable. Guidance on requirements can be found in UKBP/TP215.

The *Contractor* shall ensure that any statutory conditions and consents are considered as part of the planning, and design process.

The *Contractor* shall provide information to the *Employer* on all consent conditions during the project and any which require post-construction monitoring. These shall be provided in the Outstanding Works documentation and environmental file.

A copy of all relevant environmental applications and consents / authorisations shall be kept in the project environmental file.

## **2.4 Access and Egress**

The *Contractor* shall provide all permanent and temporary access routes as required for the Works outlined in the Project Specific Works Information. This includes the provision of any periodic maintenance work required to ensure safe access and egress to the Site and Working Areas and compounds. The *Contractor* shall note any site specific requirements or restrictions that are identified within the relevant section(s) of the Project Specific Works Information.

If vehicle movements, including the delivery vehicles or Mobile Elevated Working Platforms (MEWP's), require removal of operational substation fence panels, this is the responsibility of the *Contractor* and shall be agreed with the *Project Manager* prior to undertaking any work.

The *Contractor* shall develop, maintain and implement an Access & Reinstatement Schedule which shall detail the works required for the complete access route the *Contractor* intends to take from the public highway to each Working Area, scaffold, compound or any other site associated with the delivery of the Works. The access schedule shall, as a minimum, include the following:

- Pictorial maps and plans indicating the route to the point of work from the public highway,
- A schedule of hazards encountered on each access,
- A description of all works required to gain access, including dimensions and measurements of tracks, lay-down areas, land takes, bell-mouths, and associated temporary or permanent works (e.g. culverts, bridges, etc.),
- A description of all access re-instatement works and
- Contact details of key stakeholders for each access for affected landowners, tenants, residents, and other interested stakeholders (e.g. community groups, etc.).

The *Contractor* shall be responsible for the design, installation, supervision and eventual removal, on completion of the Works, of all temporary access roads. These roads shall be designed such as to reduce to an absolute minimum land damage caused through necessary site traffic. The *Contractor* should note that the *Employer* shall negotiate preferred access routes with the grantors. If the agreed routes are not considered suitable for the Works being undertaken at a particular Site by the *Contractor*, then the *Contractor* shall be responsible for providing an alternative solution for

acceptance by the *Employer* who shall attempt to renegotiate a different route but wherever possible the originally defined routes shall be used.

The *Contractor* shall be responsible for maintaining permanent and temporary access roads in a good serviceable condition throughout the duration of the Works and their method of working shall be such as to reduce to a minimum all site traffic.

The agreed accesses shall be adhered to at all times. All accesses shall be clearly identified where they enter or egress the public highways. The *Contractor* shall be responsible for controlling the construction traffic at these accesses in accordance with NRSWA (New Roads and Street Works Act), the TSRGD (Traffic Signs Regulations and General Directions) and other requirements as stipulated by the relevant highway authority.

The *Contractor* shall identify all accesses by means of a sign/access notice; which shall state, as a minimum, the following:

- Project Name,
- Main Contractor,
- National Grid plc,
- Tower No or Site for access,
- Further information telephone number,
- Emergency telephone number and
- Further information as required.

The format of the notice shall be agreed with the *Project Manager* and the *Contractor* shall be responsible for the supply, erection and maintenance of these notices and their ultimate removal.

Where access routes cross over or under any existing services, the *Contractor* shall be responsible for detecting and locating these as well as ensuring their protection, including the supply, installation and maintenance of suitable protective measures. All protection measures and mitigation shall be agreed with the relevant service provider, prior to any work commencing. If a service needs to be diverted either temporarily or permanently this shall be included in the Works undertaken by the *Contractor*.

Although a main consideration for access routes is to minimise the impact on land usage and soils, the provision of suitable access/egress routes to work areas relates equally to the safe movement of construction traffic and method of work. The *Contractor* shall be responsible for ensuring that the installation, maintenance and removal of all access/egress routes to all work areas are fully managed. The *Contractor* shall liaise with the *Employer's* Land Officer, and grantors as required.

The *Contractor* shall ensure that action is taken in the event that any access deteriorates, is misused or affects the operation of the grantor.

The *Contractor* shall ensure compliance with all statutory and locally agreed obligations and will liaise with Local Authorities, Highways Agency, and Emergency Services etc. as appropriate.

The *Contractor* shall be responsible for accurately defining the Working Areas required for each and all activities. If physical demarcation is required it should be in the form of post and rope, electrified fences, stock proof, hoardings or suitable industry standard temporary fencing to be established by means of a risk assessment agreed with the *Project Manager* and fully compliant with the Construction, Design and Management Regulations (CDM) requirements.

The *Contractor* shall give a high priority to maintaining the security of grantor's property. The *Contractor* shall liaise with the grantor and shall discuss any requests to improve security with the *Project Manager*.

Early site access for tree cutting and vegetation clearance may be requested by the *Contractor* if it is deemed necessary; this will be subject to a formal request to the *Project Manager*.

### **2.4.1 Provision of Roadways**

Metal roadways (or similar) delivered to site shall be free of all contaminants and clean. Any cleaning of panels required prior to relocation shall be carried out off Site. The *Contractor* shall apply DEFRA (Department of Environmental, Food & Rural Affairs) advice to ensure that all possible contamination is removed.

The *Contractor* shall ensure that the provision of any metal roadway (or similar) is completely incorporated into the programme of work such that these items are fully utilised as part of the access works. Any such roadways supplied shall not be used within 'equipotential zones' to ensure there is no inadvertent transmittal of local rise of earth potentials outside of safe zones.

Following the removal of metal roadways (or similar) the *Contractor* shall sweep all site areas with a metal detector to ensure complete removal has been achieved.

## **2.5 Consideration of Others**

Community relations issues (e.g. properties close to the site, areas of special significance, key audiences) shall be identified at the project planning stage in conjunction with the *Employer's* Community Relations Advisor. The *Contractor* shall ensure that any issues identified at the planning stage are effectively managed during the course of the Works. All subsequent sensitivities shall be brought to the attention of the *Employer's* Community Relations Advisor, either directly or via the *Project Manager*.

Where the *Contractor's* Works are at an operational site or they share the Site with Third Parties they shall comply with all local instructions and procedures specific to the Site.

The *Contractor* shall have a management system in place to assist in keeping local residents, land owners, and all other stakeholders informed during the progress of the Works.

The *Contractor* shall ensure that they maintain access to private and commercial property affected by the proposed Works at all times. The *Contractor* shall in their normal operations seek to minimise as far as possible disruption and inconvenience to Others.

## **2.6 Working Hours**

The *Contractor's* programme shall take into account the site working standard hours:

Monday – Friday                      08.00 – 17:00 hours

Unless stated otherwise, as defined in the Project Specific Works Information document.

### **2.6.1 Working Hours Specific to OHL Works**

Standard site working hours for Overhead Line Works and deliveries are 07:30 to 19:30 hours Monday to Sunday.

The *Contractor* shall ensure that the working hour constraints are adhered to within their Programme unless stated otherwise, as defined in the Project Specific Works Information document.



## **2.7 Occupied Premises and Users**

The *Contractor* shall be responsible for establishing and complying with any relevant third party constraints and requirements; specifically compliance with the third parties Safety Management Systems as detailed in the Project Specific Works Information document.

## **2.8 Pollution, Ecological, Archaeological or Environmental Impacts**

### **2.8.1 Minimising Agricultural Impacts**

The *Contractor* shall be responsible for ensuring that supplies of disinfectant, application equipment, protective clothing and straw are made available to their staff where necessary.

The *Contractor* shall only supply and use disinfectants approved by, and in accordance with, DEFRA requirements.

If working in disease affected areas, the *Contractor* shall be responsible for ensuring that all the necessary precautions are taken to prevent the spread of invasive species and plant and animal diseases during the construction phase, and that they comply with all instructions and guidance issued by the relevant authorities including but not limited to DEFRA. Further information can be found in NG/UKSHE/205 Land Management and Biodiversity Procedure.

The *Contractor* shall be responsible for the management of contaminated land in accordance with the NGUK/PM/SHE/206 - The Management Procedure for the Management of Potentially Contaminated Land where contaminated land is encountered during the project.

### **2.8.2 Minimising Land and/or Crop Damage**

The *Contractor* shall be responsible for undertaking the Works to ensure minimal damage to land and/or crops.

The *Contractor* shall formally obtain acceptance from the *Project Manager* for the specific precautions to minimise land crop damage and prevent the possible spread of crop diseases caused by the movement of earth. Any specific requests made by the growers to take additional precautions to prevent the possible spread of disease shall be discussed and agreed with the *Project Manager* prior to any work being undertaken.

### **2.8.3 Minimising Animal Disease**

In the case of animal diseases, the *Contractor* shall adhere to the farmer's animal hygiene precautions.

The *Contractor* shall ensure that any requests from the Occupier of the land to remove livestock are made through the *Project Manager*. In the case of working within areas where livestock are kept, all contact with animals must be avoided and the *Contractor* shall strictly keep to the route or area that has been agreed with the *Employer*.

If work is likely to be continued over several days, the *Contractor* shall:

- Provide temporary fencing for working areas and access routes to allow work to proceed, and permit the remainder of the field to be grazed,



- Consider the use of double stock-proof fencing where there is a risk to disease-free accredited stock,
- Close all gates and make good any damage to fences, hedges and walls, so that livestock cannot stray,
- Keep ditches and drainage outfalls open and in working order,
- Prevent pollution of streams, ditches and troughs,
- Remove all material wrappings, cleaning rags, uneaten foodstuff, general site litter and the like off site on a daily basis and keep the livestock protected from all on site stored materials , and
- Not enter livestock buildings without the farmer's permission. When entry is necessary, any request by the farmer for use of rubber boots and protective over-garments shall be complied with. Boots and garments shall be cleaned and disinfected before entry and on exit.

In addition to the above precautions, where disease affected areas have been identified within the Working Area, the *Contractor* shall provide a written Risk Assessment and method statement for acceptance by the *Project Manager* before work shall commence.

### 3 Programme / Project Controls

The *Employer* hosts Primavera (planning) and SAP (financial) systems which shall enable the *Contractor* to report project performance and cost information to the *Employer*. The *Contractor* shall comply with UKBP/TP193 which sets out the minimum requirements for project planning and project controls including, but not limited to, the following:

- Key responsibilities for the *Contractor* and *Employer*,
- The Work Breakdown Structure (WBS) to be used,
- The Cost Breakdown Structure (CBS) to be used to match the WBS and create meaningful control accounts for earned value calculation and reporting,
- Mandatory milestones to be used,
- The process for establishing and approving baselines,
- How to record progress against the schedule each month;
- The process for reporting Value Of Work Done (VOWD) and forecast each month and
- Procedure for cost and schedule management.

The *Contractor* shall ensure the build-up of their budget loaded Programme and their tender submission are aligned to the National Grid WBS specified in UKBP/TP193. The *Contractor* shall have notified the *Employer* during the tender of any project where this is not possible.

The *Contractor* shall comply with UKBP/TP205 which sets out the *Employer's* work planning process and make themselves aware of the outage and specialist resources being planned for their specific project and ensure that a Construction Plan is drafted within these constraints.

The *Employer* may be required to facilitate other works during the programmed Outages. These will be discussed and organised through the UKBP/TP153 HV Coordination Management Process. The *Contractor* is required to cooperate with the *Employer* and other contractors in this regard.

The *Employer* operates a risk management process for design and site installation Works which is set out in UKBP/TP163 and UKBP/TP188. The *Contractor* is required to comply with the risk management process detailed in this procedure.

## 4 Design Management

The design management process is defined in UKBP/TP188. This shall include all drawings, schedules, reports, surveys and other documents used in the manufacture and installation of the Works - i.e. all those items marked 'For Construction' or similar that articulate the 'Detailed Design'.

### 4.1 Design Responsibility

The *Contractor* shall employ formal design procedures in accordance with UKBP/TP188, incorporating review and *Contractor* Design Approval processes, forming part of their company Quality Management System. These shall be applied unilaterally to in-house and all subcontracted design activities.

The *Contractor* shall be responsible for compliance with the requirements of UKBP/TP188, with particular regard to:

- a) Delivering a fully integrated and holistic design solution and for managing all interfaces between the different technical disciplines,
- b) Integrating the proposed design with existing systems, such that the functionality, safety, build quality, operation or maintainability of these are not reduced or compromised,
- c) All aspects of the detailed design, which forms the basis of the manufacturing, installation and commissioning of the Works and which shall become the as-built records,
- d) Ensuring compliance with the suite of functional Technical Specifications (TSs) supported by Technical Guidance Notes (TGN's) and Design Handbooks (DHs) provided by the *Employer*,
- e) Ensuring their Quality Management System (QMS) aligns with the requirements of UKBP/TP188 with particular regard to Design Compliance Audit and those associated with design change controls,
- f) Checking and approving drawings, structural calculations or other documents comprising the 'Detailed Design' prior to their submission for Design Assurance, and
- g) Reviewing and commenting on design works produced by Others, for associated overhead line modifications, substation and cable works.

### 4.2 Employer's Design Requirements

#### 4.2.1 Design Specifications

The *Employer* provides a suite of technical documents. In preparing a project design the *Contractor* shall adhere to the requirements of these documents. The *Contractor* shall ensure that they use the standards required for the Works from those listed throughout the Works Information and Appendix One.

If, when preparing a project design, it is found that there is no corresponding Technical Specification, this deficiency must be brought to the attention of the *Project Manager* who will define the course of action to be undertaken.

The *Employer* is committed to ensuring that accidents and incidents do not arise as a result of inadequacies in project design. The *Contractor's* own design processes must target the achievement of 'Safety by Design'.

The *Contractor* shall be responsible for the removal or mitigation, via suitable design & safe systems of work, of the dangers arising from impressed currents & voltages whilst working on HV Systems in accordance with UKBP/TP234 - Management of Impressed Voltages and Methods of Control.

#### **4.2.1.1 Contractor's Detailed Design**

The *Contractor* shall be responsible for ensuring that the detailed design of the P&C, HV Substation, HV Cable, Overhead Line (OHL) and Civil Works, as identified in the Project Specific Works Information, complies with the requirements identified within the *Employer's* Technical Specifications.

The detailed design process for the Works shall be in accordance with UKBP/TP188.

#### **4.2.2 Construction Design Specification: Substation (CDS-SUBS)**

The construction design specification can be found within the Project Specific document.

#### **4.2.3 Construction Design Specification: Protection, Control and Telecoms (CDS-PCT)**

The construction design specification can be found within the Project Specific document.

#### **4.2.4 Construction Design Specification: Civil (CDS-CIV)**

The construction design specification can be found within the Project Specific document.

#### **4.2.5 Construction Design Specification: Overhead Lines (CDS-OHL)**

The construction design specification can be found within the Project Specific document.

#### **4.2.6 Construction Design Specification: Cable (CDS-CAB)**

The construction design specification can be found within the Project Specific document.

### **4.3 Design Submission Procedures**

To ensure that all design work undertaken complies with the *Employer* requirements the *Employer* shall carry out Design Compliance Audits of the key stages determined in UKBP/TP188 or otherwise requested by the *Employer* for each and every project. Confirmation of a satisfactory audit will be by the *Employer* signing on to the documentation relevant to the particular stage of the project as per UKBP/TP188.

The *Contractor* shall be responsible for a design submission process which fully complies with the *Employer's* Design Compliance Audit requirements, particularly those associated with Change Control, as required in UKBP/TP188.

The *Contractor* shall formally submit the design drawings for assurance purposes in hard copy, unless electronic submissions have been formally agreed by the *Project Manager*.

All design submissions shall be accepted by the *Employer* prior to use (or manufacture) or installation purposes.

#### **4.3.1 Design Delivery Programme**

The *Contractor* shall produce a Design Delivery Programme, in accordance with the requirements in UKBP/TP188, to facilitate the level of design assurance to be undertaken by the *Employer*. This shall identify Design Compliance Audit package(s) for each technical discipline (i.e. P&C, HV Substation, HV Cables, OHL, Civil, etc.) which shall have a Design Compliance Assurance Audit Report (DCAAR) document issued. These shall be identified as milestones on the *Contractor's* Programme.

The *Contractor* shall provide key milestones with the design delivery Programme to identify design submissions, meetings etc. for all aspects of the Works, unless agreed otherwise with the *Project Manager*.

### **4.3.2 Design Compliance Audits**

The Design Compliance Audits comprise inspections of selected components of the 'Detailed Design' to an extent, pre-determined by the *Employer*, at which the *Employer* shall, when satisfied, formally consent to the installation, or in some instances manufacture, of the relevant 'elements'.

A Design Compliance Audit is not a check of the 'Detailed Design' nor does it approve or authorise the 'Detailed Design'. It is a risk based activity forming an auditable part of the *Employer's* technical governance duties. Only those parts of the 'Detailed Design' that the *Contractor* is satisfied are suitable for issue as 'For Construction' shall be submitted for Design Compliance Audit.

#### **4.3.2.1 Design Compliance Audit – Satisfactory Outcome**

A satisfactory Design Compliance Audit shall be formally notified to the *Contractor* at which point it is deemed that the *Project Manager* consents to that 'element' of the design being incorporated into the Works and installation (or manufacture) may commence. In the context of this section the term 'element' shall apply to any part of P&C, Substation HV, Civil, OHL, HV Cable or other engineering category forming part of the 'Detailed Design'.

The formal consent given to the 'Detailed Design' or any parts thereof following a satisfactory Design Compliance Audit in no way modifies responsibilities for the design of the Works.

#### **4.3.2.2 Design Compliance Audit – Unsatisfactory Outcome**

An unsatisfactory Design Compliance Audit shall be formally notified by the *Project Manager* to the *Contractor*.

The *Contractor* shall be responsible for reviewing the *Project Manager's* comments and the design shall be re-submitted and re-audited by the *Project Manager*. All re-submissions shall be in accordance with achieving the timescales identified in the *Contractor's* Design Delivery Programme, unless agreed otherwise by the *Project Manager*.

The *Contractor* shall note that the *Employer* reserves the right to cancel any Outages should the appropriate drawings and/or other documentation not be the subject of a satisfactory Design Compliance Audit.

### **4.3.3 Design Re-Submissions**

Any part of the 'Detailed Design' having previously been subjected to a satisfactory Design Compliance Audit that is modified in any way shall be re-submitted for further Design Compliance Audits as necessary. The timescales, identified in the *Contractor's* Design Delivery Programme shall again apply, unless agreed otherwise by the *Project Manager*.

## **4.4 Design Coordination**

The *Contractor* shall be responsible for ensuring that design co-ordination is fully enacted with regards to their own designs and that of any interfacing designs. Design Handbook 30 provides specific guidance and good practice on the substation to OHL/Cable design interface.

## 4.5 Requirements of Others

Where there are a number of stakeholders (identified within the Project Specific Works Information document) that the *Employer* has been in negotiations with during development of the Works (these may consist of entities such as Local Planners, Environment Agency, Highways Authorities, Natural England, Government Agencies, Distribution Network Operators (DNO), Network Rail, grantors and Others), these entities may require protection of their assets from oversailing Works. Innovative solutions to complex crossing problems will be viewed favourably by the *Employer* particularly if time, SHE or cost savings can be made. All innovative solutions shall be subject to acceptance by the *Employer* and the affected Authority.

The *Employer* requires that the *Contractor* does not, unless otherwise requested by the *Project Manager*, enter into any negotiation with any of these or other entities in the delivery of the Works and that any requests received directly from these bodies are logged, recorded and contact details passed directly to the *Project Manager* without delay.

## 4.6 Design Approval from Others

The *Contractor* shall be responsible for engaging with other contractors, where there is a known design interface (i.e. HV Substation, HV OHL, HV Cables, etc.) and/or with other parties (i.e. Bulk Purchase Equipment (static wound equipment), Generators, DNO, etc.) to ensure that their project design is the most cost effective solution which does not compromise any other party's programme and objectives. This does not remove any of their duties and responsibilities identified by current CDM Regulations and UKBP/TP137.

## 4.7 Emergency Return to Service (ERTS) Requirements Strategy

The detailed design and methodology for the removal of old/redundant plant and equipment, and the installation, testing and commissioning of new Plant and Materials will need to consider the requirements for 'Emergency Return to Service' conditions.

The timescales and constraints for returning a circuit or circuits, under emergency system conditions, shall be defined within the Project Specific Works Information document as applicable.

The *Contractor* shall be responsible for a design and installation strategy for providing ERTS solutions within the defined criteria identified in the Project Specific Works Information and shall include, as a minimum, all necessary equipment (i.e. temporary by-pass conductors, temporary protection and secondary wiring, etc.). The design and installation philosophy shall seek to both minimise systems outage durations, and provide a robust strategy for providing ERTS solutions within the defined criteria.

## **5 Employer's Work Specification and Drawings**

### **5.1 Applicable Standards**

The *Contractor* shall work in accordance with the *Employer's* standards and specification for current issue at time of Contract Date (which can be found on the National Grid Engineering document Extranet) and as detailed within Appendix One. If the standards or specifications are updated during the progress of the Works the *Project Manager* shall advise the *Contractor* of the implications of any changes to the Works Information by the issue of a Project Manager's Instruction (PMI). The *Contractor* can access the standards, specifications and other referenced documents through the National Grid Engineering Extranet or [www.nationalgrid.com](http://www.nationalgrid.com) for NSIs. The *Contractor* will also be notified by the *Employer's* Document Management Officer of any revision changes to the listed documents.

Where no relevant *Employer's* specification exists, the following nationally/internationally recognised standards or codes of practice shall apply: - EN, IEC, BSI, ENA, ELECTRA etc.

Where the *Contractor* has any doubt or there is a conflict between these standards or any other requirement, the *Contractor* must seek guidance from the *Project Manager*.

### **Technical Specifications (TS/NGTS)**

These are hierarchical technical documents starting with overall system level (TS 1), technology specific level (TS 2.\*.\*) and detailed technology specific level (TS 3.\*.\*). These are the *Employer* specific requirements including reference to National and International standards that are appropriate to the asset/technology i.e. IEC, BS, ELECTRA and BS-EN, ASTM etc.

### **Transmission Procedures (TP)**

These are documents describing the *Employer's* processes e.g. design management, process management, etc. including compliance with external legislative and other statutory requirements (e.g. Construction Design Management (CDM)).

### **Design Handbooks (DH)**

The Design Handbooks detail the design requirements for plant, equipment and technology specific application and determine how these items shall be designed and interfaced with existing equipment already installed on the *Employer's* Transmission System.

### **Commissioning Handbooks (CH)**

The Commissioning Handbooks documents are prepared for different plant types (e.g. transformers, cables, overhead lines) and technology specific application and determine how the items will be commissioned to be accepted onto the *Employer's* Transmission System.

### **Site Commissioning Test Schedules (SCT)**

These are a series of technology specific commissioning test requirements to be adopted during stage 1 & 2 commissioning of various equipment technologies for both HV and Secondary Equipment. The correct completion of appropriate schedules to the technology being commissioned is a mandatory part of the commissioning process as required by UKBP/TP106. The reference index in the Works



Information document, to be found in Appendix One, shall be consulted to establish the status of these documents for use.

## **National Grid Safety, Health and Environmental (SHE) Procedures**

These are documents describing the *Employer's* minimum standard requirements for the management of Safety, Health and Environment whilst undertaking the Works

## **Safety Rules and National Safety Instructions (NSI)**

These documents detail the management requirements in maintaining **Safety from the System** that shall be complied with when working on and/or adjacent to High Voltage Plant, Equipment and Materials\* (NSI available via [nationalgrid.com](http://nationalgrid.com)).

**Note\*:** - The definitions for Plant, Equipment and Materials have specific meanings in National Grid Safety Documents and these definitions apply only after acceptance onto National Grid's Transmission System. Prior to this, NEC definitions of Plant and Materials, and Equipment shall apply.

## **Technical Guidance Notes (TGN)**

There are a range of Technical Guidance Notes across a range of technologies that may need to be consulted in the design process; these documents may be referenced in the equipment level TS specifications. The reference index in the Works Information document, to be found in Appendix One, should be consulted to establish the status of these documents for use.

## **Other Documents**

Further document types not listed above which are applicable to the Works may be referenced within the Project Specific Works Information, (e.g. Engineering Bulletins (EB), Transmission Design Circulars (TDC) and Equipment Modification Instructions (EMI)). These, although not fully described, provide supporting information for many of the specifications, procedures and policies listed above.

## **Type Registration**

The purpose of UKBP/TP183 – Type Registration Equipment Procedural Requirements is to define the procedural arrangements for the Type Registration of equipment to verify that the specific equipment for use on or directly connected to the Electricity Transmission System is deemed suitable for their intended application.

## **5.2 Drawings**

All contract drawings and associated supporting documentation supplied to the *Employer* shall be in full compliance with the *Employer's* drawings management business procedure UKBP/TP135.

The *Contractor* shall be responsible for the use of the *Employer's* Electronic Collaborative Project Management Tool in order to view, access, download, modify and subsequently return 'As-Built' master records (including any new drawings) utilising defined workflows/processes. In order to access the system, the appropriate user license(s) must be requested by the *Contractor*, as well as undertaking the appropriate user training.

If any modification is made to any part of the Works, including any changes after Completion up to the Defects Date in pursuance of any obligations, the electronic master drawings shall be modified, as



necessary, to fully reflect the 'As-Built' status following the modification. The *Contractor* shall be responsible for supplying to the *Employer* hard copies of each affected drawing, in accordance with the requirements identified in UKBP/TP135.

Any drawing information to update the Geographic Information System should also be supplied, in line with the above.

The *Contractor* may provide the option to offer the use of an Electronic Collaborative Project Management Tool in order for the *Employer* to view, access, and download the submission of drawings during the design stage. In order to access the system, the appropriate user license(s) must be provided, as well as undertaking the appropriate user training.

## 6 Working with the *Employer* and Others

The *Contractor* shall produce written records that shall be kept for all communications with third parties, including telephone conversations and site visits.

### 6.1 Sharing the work area with the *Employer* and Others

Where the *Contractor* is undertaking the duties and responsibilities of Principal Contractor, as defined by the current CDM Regulations and UKBP/TP137, then the *Contractor* shall be responsible for:

- The General H&S of the *Employer* and Others working within the *Contractor's* work areas,
- Ensuring that full cooperation of all parties is enacted with particular regard to the provision of all necessary information within agreed timescales in accordance with the requirements of current CDM Regulations and occupiers procedures (i.e. National Grid Transmission Procedures), and
- Integration of the *Employer* and Others in to the *Contractor's* Delivery Programme and that this is fully coordinated. The *Contractor* shall be responsible for ensuring that all delivery and installation interfaces are identified and managed throughout the site delivery and installation processes.

#### 6.1.1 Authorities and Utilities Providers

The *Contractor* is responsible for keeping a record of all consultation with statutory and non-statutory organisations and for copying all correspondence (sent and received) and meeting notes to the *Project Manager*. A summary or index of all this correspondence is required to be kept for ease of access on a Consultation Schedule. An example Consultation Schedule is given in Appendix A. It should be noted that other members of the *Contractor's* or *Employer's* project teams will need to add to the Consultation Schedule and so a system for updating this document shall be prepared and communicated by the *Contractor*.

Copies of all file notes, letters or minutes of consultation meetings shall be copied in the Project Environmental Management Plan (PEMP) or environmental files.

Any un-scheduled visit by an Enforcing Authority shall be processed using the *Employer's* procedure NGUK/PM/SHE/20 SHE Communication and Information. The *Employer's* representative and CDM Advisor shall be notified.

## 7 Management of the Works

The *Contractor* shall be responsible for the complete management of the Works including those of its subcontractors and Others\*. This shall include, but not be limited to, the following:

- The preparation and formal agreement of the Design Intent Documentation (DID) as defined in UKBP/TP188. The DID shall clearly define the design requirements of each technical discipline (i.e. P&C, Civils, HV Substation, HV Cables, OHL, etc.) identified within the Project Specific Works Information document and that all the various project design elements are fully integrated and effectively coordinated,
- The management and coordination of the Programme,
- The management and coordination of *Contractor's* resources,
- The procurement and management of all manufacturers, suppliers and subcontractors,
- Site Management;
  - Safety Management,
  - Security Management,
  - Interface management with OHL/Cable and Substation contractors and National Grid ETO Operations,
  - Progress Reporting,
  - Delivery Logistics, and
- Highways Authority Government Agencies, etc. and other statutory bodies interface.

Note\*: Where the *Contractor* is enacting Principal Contractor they shall be responsible for management of all contractors (including those directly engaged by the *Employer* or a Third Party) within their work area(s) in accordance with the requirements of the current CDM Regulations and UKBP/TP137.

### 7.1 *Contractor's* Project Resources

The *Contractor's* shall be responsible for appointing dedicated, competent and experienced managers, engineers and supervisors, with regard to the various technical disciplines or elements of the work identified in the Project Specific Works Information document. They shall be available to act in providing prompt and efficient support to the *Project Manager* with design, engineering, health & safety, environmental, procurement, manufacturing, installation and construction and contractual/commercial and project controls matters.

The *Contractor* shall be responsible for ensuring that all resources employed in the delivery of the Works have the skill, knowledge, competency and experience to discharge their roles and responsibilities.

The *Contractor* shall make available to the *Employer* on request, evidence of training and/or competence of all staff & those of any Subcontractors employed during the execution of the project including evidence of training where appropriate.

Key project roles are identified in UKBP/TP141 and UKBP/TP137.

The *Contractor* shall provide all personnel, facilities, equipment, consumables, transportation and support services to fully undertake their project management functions for the duration of the Works.

**Contractor's Project Manager:** The *Contractor* shall be responsible for the provision of a Project Manager for the duration of the Works with delegated authority to act for and on behalf of the *Contractor* on all matters within the Contract.

**Site Manager:** The *Contractor* shall be responsible for the provision of a Site Manager, who shall be on site full time from site mobilisation until taking over of all Plant and Materials and shall work solely on the Contract during this time, unless otherwise agreed by the *Project Manager*.

The Site Manager shall be appointed in advance of mobilisation to allow sufficient time for familiarisation with the *Contractor's* procedures and the Works.

The *Contractor* shall seek acceptance from the *Project Manager* prior to the replacement of the Site Manager. There shall be at least one day's handover on site.

#### **7.1.1 Project Commissioning Resource**

The *Contractor*, where commissioning and/or decommissioning activities are to be undertaken, shall be responsible for the provision of Commissioning Engineer(s) (Supplier) for the commissioning of all Plant and Materials within the Works, in accordance with the *Contractor's* own procedures and in conjunction with the *Employer's* Transmission Procedure UKBP/TP106.

The *Contractor* is responsible for ensuring that the Commissioning Engineer(s) (Supplier) undertakes work only on the Contract during this time, unless otherwise agreed by the *Project Manager*.

The *Contractor* shall be responsible for providing the Commissioning Engineer(s) (Supplier):

- Prior to Stage 1 commissioning - to ensure that they are fully familiarised with the scope of the Works and to ensure that they have prepared all relevant commissioning documentation and processes in accordance with UKBP/TP106,
- During Stage 1 Commissioning – to manage and execute the Commissioning Programme and the completion of all relevant commissioning certificates in accordance with UKBP/TP106, and
- During Stage 2 Commissioning - to be present at site to assist the *Employer's* Commissioning Engineer with commissioning activities.

The *Contractor* shall be responsible for ensuring that the Commissioning Engineer(s) (Supplier) is available to attend all Commissioning Panel Meetings as defined by the *Project Manager*.

#### **7.1.2 Project Temporary Works Coordinator**

The *Contractor* is responsible for appointing their own authorised Temporary Works Coordinators in line with UKBP/TP184 and advising the *Project Manager* of those employed on the project.

### **7.2 Contractor Procurement**

The *Contractor* shall provide a first issue controlled Procurement Plan and/or schedule to the *Project Manager* a maximum of 12 weeks following the Contract Date to allow the *Project Manager* to review ahead of placement of orders.

The Plan shall identify as a minimum:

- Proposed Subcontractors/Suppliers,
- Plant and Materials to be purchased,
- Specification data sheet requirements,
- How suppliers will be controlled e.g. inspection, expediting etc. ,

- Plant and Materials conform to the *Employer's* specifications,
- Purchasing and delivery Programme,
- Certification requirements, and
- Operation and Maintenance Manual requirements.

Un-priced copies of all purchase orders and amendments, including data sheets shall be maintained by the *Contractor* and, where requested, submitted to the *Project Manager*.

Orders for Plant and Materials for the permanent works shall state that the *Employer* may wish to verify the conformity of the Plant and Materials at the Subcontractors/Suppliers place of manufacture.

### **7.3 Site Establishment / *Contractor's* and *Employer's* Accommodation**

The *Contractor* shall make full provision for main site establishments to include office, meeting room and welfare facilities required for their Works, together with accommodation for *Employer's* staff if indicated in the Project Specific Works Information document.

The *Contractor* shall be responsible for the identification and implementation of general Site management provisions.

The *Contractor* shall be responsible for the development, implementation and maintenance of the Site Establishment Plan, from information provided in the Project Specific Works Information document.

The *Contractor* shall provide the Site Establishment Plan a minimum of six (6) weeks prior to Works commencing at Site, for acceptance by the *Project Manager* and Occupier.

Following acceptance, the *Contractor* is responsible for the implementation and maintenance of the Site Establishment Plan.

Any subsequent changes made to the Site Establishment Plan by the *Contractor* shall require formal presentation and acceptance by the *Project Manager*.

#### **7.3.1 Site Establishment Plan**

The *Contractor's* Site Establishment Plan shall provide, as a minimum, the following details:

- Site Planning Information - All legislative requirements required under The Health and Safety at Work etc. Act 1974, associated Acts and Regulations, together with relevant *Employer* Transmission Procedures, SHES Management Procedures and National Grid Safety Rules and associated National Safety Instructions (NSIs), etc. together with the *Contractor's* own Management Systems,
- Site Access - Site control of access/egress arrangements, throughout the duration of the Works, to ensure that the safety and security of employees is maintained and that all construction staff, site deliveries and site visitors are accounted for,
- Site Lighting - Lighting requirements to ensure that all access/egress routes are clearly visible during operational hours and to afford maximum illumination to the work areas,
- Wheel Cleaning Facilities - Where identified as a requirement, the *Contractor* shall identify and agree the location of the wheel cleaning facilities installation, provide the maintenance/cleaning requirements and the management information for its use by construction traffic and delivery vehicles leaving the site,
- Signage - The locations for all required on site construction signage (i.e. speed limits, vehicle and pedestrian access/egress routes, emergency exit routes, muster points, etc.),

- Site Amenities, Storage and Work Areas - Identification of all site amenities, storage and work areas which shall be implemented in accordance with the requirements of the current Construction (Design & Management) Regulations,
- Accommodation and Facilities - Identification of all site accommodation and facilities, installation requirements that the *Contractor* is providing for use by all their staff, the *Employer's* staff and Third Parties, including any "nominated" subcontractors identified in the Project Specific Works Information document,
- Fire Risk Assessment - Identification of the fire risk assessment requirements for the Works to identify level of fire safety required throughout the site works (i.e. fire alarm systems, emergency exit routes, fire extinguishers, etc.),
- Material Storage - Identification of designated storage areas together with controls for managing their security,

Note: - Wherever possible, the *Contractor* shall arrange for materials to be delivered directly to their place of use.

- Fuels and Lubricant Storage - Provide the location (where on-site requirement) of bespoke and secure fuels and lubricant storage areas, together with the security, control and maintenance requirements and the safety management information for its use by construction staff for their vehicles/plant,
- Flammable Liquids - Identification of the location, storage facility, security control and management arrangements for all flammable liquids stored on site,
- Gas Cylinders - Identification of the location, storage facility, security, control and management arrangements for gas cylinders stored at site, and
- Hazardous Materials - Identification of the location, storage facility security, control and management arrangements for Hazardous Materials stored at site.

## **7.4 Contractor's Site Emergency Plan**

The *Contractor* shall be responsible for developing a project specific emergency plan (from information provided within the Site Information (Pre-Construction Information Pack) for all foreseeable emergency situations at the construction site for the *Project Manager's* and Occupier's acceptance at the Pre-Site Start SHES Meeting.

The *Contractor* shall be responsible for ensuring that the Site Emergency Plan is fully implemented, maintained and tested throughout the Works.

The *Contractor* shall provide contact telephone numbers of key *Contractor's* staff to the *Project Manager*, for use in Emergencies.

## **7.5 Security**

The *Contractor* shall be responsible for the development, maintenance and implementation of a Security Plan which shall detail and manage all necessary provisions to protect the Works, which shall, as a minimum, be in compliance with Electricity Safety, Quality and Continuity Regulations (ESQCR).

The *Contractor* shall formally submit the Security Plan to the *Project Manager* for acceptance a minimum of six (6) weeks prior to Site Establishment.

### 7.5.1 Protection of the Site

The *Contractor* shall be responsible for the management of security to the Works Site, Plant and Materials, and any existing buildings and/or areas affected by the Works from damage and theft.

The *Contractor* shall ensure they manage access and egress of the Site in order to prevent unauthorised access.

If access and egress to a HV compound is necessary then a gateman is required to be a minimum of a 'Person' as defined by the *Employer's* National Safety Instructions 6 and 8, for all operational sites. Comprehensive site security is required for all stages of the work. Companies who are members of the British Securities Industries Association or the International Professional Security Association should provide site security. Advice should also be sought from the appropriate police authority on local conditions.

The *Contractor* shall ensure that there is continuity of security arrangements during the handover process until the Completion of the whole of the Works unless specified otherwise in the Works Project Specific Works Information document.

### 7.5.2 Identification of People

The *Contractor* shall be responsible for maintaining the contact list for their key personnel for the project.

The *Contractor* shall submit promptly to the *Employer* when requested, the full contact details of the key personnel for the purposes of the F10 Notification in accordance with CDM Regulations and UKBP/TP137.

The *Contractor* shall ensure that site evacuation procedures are prepared and tested, in accordance with their Emergency Plan. The specific emergency arrangements shall be defined within the Site Emergency Plan and as part of the Construction Phase Plan.

Each *Contractor* employee or subcontractor employee shall have a form of identification on them at all times that details the following:

- The company they work for,
- Date inducted on to Site, and
- The person's forename and last name.

The *Contractor* shall provide the contact details for the *Contractor's* Site Manager including their name and telephone number to the *Project Manager*.

All personnel shall declare any pre-existing health conditions which may affect them and/or any other person's, health and safety whilst on site.

The *Contractor* shall take precautions for the health and safety of their staff, workers, *Employer's* staff and Third Parties from theft and vandalism. Where an individual is providing access to a high voltage compound (under the provision of system Safety Rules), the person must hold a BESC Authorisation and relevant Occupier's Safety Rules Authorisation (National Grid Person or other operator approval (as appropriate)).

### 7.5.3 Control of Site Personnel



The *Contractor* shall be responsible for the access/egress control of site personnel; the management of this shall be detailed in the Site Establishment Plan

Where the *Contractor* is the Principal Contractor they shall put in place a system to ensure personnel and visitors that are present in the Site Working Area, irrespective if remote to the site establishment facility, can be located and accounted for in the event of an emergency. This shall include, but not be limited to, Subcontractors *and Employer's* staff.

A means of reliably contacting staff and visitors shall be put in place and should not be reliant on mobile phones in areas of poor signal strength. Any individual or groups that may request access that are not part of the *Employer's* or *Contractor's*/subcontractors staff shall be denied access and referred to the *Contractor's* site representative. This shall not apply to bona fide representatives of the Health and Safety Executive or other enforcement agencies; in this case the *Project Manager* shall be informed immediately.

## **7.6 Contractor's Traffic Management Plan**

The *Contractor* shall be responsible for the development, maintenance and implementation throughout the Works of a Traffic Management Plan (TMP), detailing compliance with the requirements and regulations of the Police, Highways Authority and Local and County Authorities concerning the routing of vehicles, Plant and Materials and Equipment and access to and from the Site/s and Working Areas.

The *Contractor* shall formally present the TMP to the *Project Manager* and Occupier for acceptance at the Pre-Site Start SHES Meeting.

A TMP may have already been prepared during the Development Consent Order (DCO) or planning process for specific projects, details of which will be provided within the Project Specific Works Information document.

The *Contractor* shall comply with all the requirements, regulations and restrictions of this draft TMP and the Police, Local and County Authorities and their agents as well as those of all landowners, concerning the routing of vehicles, Plant and Materials and Equipment and access to and from the Site and Working Areas.

The *Contractor* shall instigate measures to minimise private vehicles within the Construction Areas unless agreed otherwise with the *Project Manager* or *Supervisor*.

## **7.7 Site Cleanliness**

The *Contractor* shall be responsible for maintaining the cleanliness of the Site, compounds and, where applicable, surrounding areas as identified in the Project Specific Works Information. The *Contractor* shall ensure that all persons employed at Site are aware of these requirements.

The *Contractor* shall ensure that vehicles leaving the Site do not deposit mud or other materials on the Occupier's access roads and the public highway, and shall regularly review the road access and conditions, clearing the road of mud and debris and repairing any damage caused.

The provision of suitable wheel wash facilities shall be provided by the *Contractor* as required. Any damage to roads, walkways, trenches or compound surfaces caused by the actions of the *Contractor* (or their subcontractors) shall be replaced / reinstated at the *Contractor's* own expense.



The *Contractor* shall identify how they intend to manage this requirement within their Site Establishment Plan.

## **7.8 Protection of Existing Structures and Services**

Where the construction site interfaces with existing assets the *Contractor* shall be responsible for providing appropriate protection to those assets from the construction activities required for the Works. This will apply to all assets irrespective of ownership that may be affected or put at risk by the Works. Some examples of the possible issues that may arise during the course of the Works that should be considered, but not limited to, include:

- Buildings, structures and associated foundations,
- Existing Operational HV Equipment including HV Cables,
- Roads, street furniture, drainage, footpaths, bridleways, private roads and access tracks,
- Water courses, ditches, flood defences trees, hedgerows,
- Archaeology, SSSI Sites etc.,
- Fences, gates, walls, perimeter fences, site drainage, interceptors, LVAC supplies, earthing systems, multicore cable trenches,
- Utility services, water, gas, telecoms, sewers,
- OHL towers, OHL Spans for 'duck unders', over-sailing conductors, landing gantries and anchor blocks,
- Cable Sealing End Compounds and Equipment, and
- Busbars, support insulators, other Substation Equipment.

The *Contractor* shall, where detailed in the Project Specific Works Information document, be responsible for any requirements to protect or divert (temporary or permanent) utility services. This includes, but not limited to, the following:

- Electric supplies of the Distribution Network Operators,
- Gas supplies,
- Communication networks,
- Water networks, and
- Pipeline networks.

The *Contractor* shall, prior to commencing the Works, identify and locate all existing pipework, plant, equipment, cables, drainage and other services on or crossing the site associated with the Works.

## **7.9 Hazard Register/Risk Management**

The Hazard Register is produced by the *Employer* and shall be provided to the *Contractor* within the Project Specific Works Information document.

The *Contractor* shall be responsible for the development, implementation and maintenance of the Hazard Register throughout the Works in accordance with UKBP/TP188.

## **7.10 Reporting and Documentation**

### **7.10.1 General**

The *Contractor* shall comply with the UKBP/TP193 which sets out the minimum requirements for project planning and project controls.

The *Contractor* shall produce a Document Schedules, in accordance with the requirements detailed in UKBP/TP135 and UKBP/TP188 at key dates agreed in the Programme for agreement with the *Project Manager*. The schedule shall define the documents and supporting information to be provided during the Works, indicating timescales and issue status. Documents requiring design compliance audit are expected to include, but not be limited to, the following:

- Outline drawings,
- List of components for outline drawings,
- Connection diagrams,
- SCT 36 Test plans,
- Schematics of control cabinets, as applicable,
- Design Intent Document,
- Detail Design drawings,
- System Design calculations, reports & schedules, and
- Any other document/drawing as required.

There is also a Contract Management Tool (Conject) that the *Contractor* is required to use for all correspondence associated with contract documentation generated throughout the Contract. The *Contractor* is required to have procedures in place, at their own cost, to operate the 'Conject' tool. The *Employer* shall provide access for up to three *Contractor* users. All training costs for *Contractor* users shall be borne by the *Contractor*.

### **7.10.2 Contract Status Report**

The *Contractor* shall produce and submit a Contract Status Report to the *Project Manager*, on a monthly basis, a minimum of three (3) days prior to the Monthly Progress Meeting.

The Contract Status Report shall comprise of, but not limited to, the following:

- A. Safety, Health and Environmental
  - CDM Regs and UKBP/TP137 compliance (e.g. CDM Zone changes),
  - Risk Assessment and Method Statement (RAMS) Register,
  - Safety Audits, Inspection and Monitoring,
  - Environmental audits, assessments and
  - SHE Incidents.
- B. Progress
  - Key/Milestone Dates,
  - Progress Review,
  - Programme (e.g. changes to programme (i.e. slippages, etc.), overall completion and VOWD) and
  - Project Risks.
- C. Resources
  - Organisational Changes,
  - Resource Levels and
  - Subcontractors.
- D. Finance
  - Finance Summary,

- Contract Change Notifications,
- Compensation Events and
- Progress Payments & Invoicing.
- E. Quality Assurance/Controls
  - Quality Assurance Audits,
  - Site Installation Quality Sensible Monitoring Reports,
  - Quality Issues,
  - Status of Project, Design and Site Quality Plans,
  - Snag and Defects Register Status and
  - Non Conformance Status.
- F. Engineering
  - Type Registration Issues,
  - Design Status and Concerns (DID Status, etc.),
  - Design Review Meetings,
  - Technical Queries,
  - Drawing Status (Masters, For Construction, As-Built, etc.),
  - Contract Drawing List (status at site) and
  - Relay Setting Status.
- G. Manufacture & Factory Acceptance Testing
  - Procurement Status (Lead Times, Delays, etc.) and
  - Factory Testing (Programme, Results, etc.)
- H. Installation, Site Testing and Commissioning
  - Installation Programme Status,
  - Inspection and Test Plan Status and
  - Commissioning Status.
- I. Interfaces
  - Third Party Interfaces (e.g. Bulk Purchase Supplier /Contractor) and
  - Interfaces with other Projects
- J. Final Record Status
  - O&M Manuals,
  - Schedule of Plant and Materials,
  - Redundant Equipment List and
  - As-Built Information.
- K. Attachments
  - Programme,
  - Non-Conformance Register,
  - Technical Query Register,
  - Defects Register,
  - Type Registration Control and Action Log and
  - Monthly Progress Meeting Action Log.

### **7.10.3 Photographic Records**

The *Contractor* is responsible for providing documented evidence on the condition of Site prior to any activities commencing, during site activities and following completion at Site (including proposed access and egress routes). Copies of all documented evidence shall be submitted to the *Project Manager* at each stage of the Works.

These shall include, but not be limited to, the following photographic records:

- a) General condition of existing site and surrounding area including, public highways, site access roads, etc. prior to Site Establishment and following Site De-mobilisation,
- b) All Site works, not visible after reinstatement, prior to reinstatement,
- c) Work activity Hold and Notification points identified within the *Contractor's* Inspection and Test Plan(s), prior to and following that relevant activity,
- d) All Temporary Work activities (e.g. scaffolding, excavations, transformer movements, etc.)
- e) Agreed Defects prior to and following remedial action,
- f) Ratings/name-plates for all Plant and Materials which are to be installed/erected, prior to installation/erection, and
- g) Weekly general views of the construction site(s) from specific locations agreed by the *Project Manager*.

The *Contractor* is responsible for providing a schedule of condition including photographic records for all existing structures and services that relate to the Works and shall be agreed with the *Project Manager* and any relevant parties.

All photographs shall be provided digitally in colour with a minimum resolution size of 300dpi, date and time stamped with a clearly defined file title/description.

Unless agreed otherwise by the *Project Manager* all photographs shall be kept confidential to the *Employer* to maintain security of Plant and Materials and the sites/locations.

The *Contractor* shall provide additional photographs as identified in the Project Specific Works Information document.

#### **7.10.4 Installation, Operation and Maintenance Documentation (IOM)**

The *Contractor* shall be responsible for ensuring that an Installation, Operation and Maintenance (IOM) document is available on delivery of Plant and Materials at Site.

The *Contractor* shall formally submit the IOM documentation to the *Project Manager* a minimum of four (4) weeks prior to Stage 1 Commissioning. Documentation shall be specific to the Equipment supplied; common documents containing multi-site information shall not be accepted.

The *Contractor* shall formally submit to the *Employer* all Operating & Maintenance Manuals in electronic format (pdf) written to CD.

The *Contractor* shall formally submit to the Occupier all Operating & Maintenance Manuals in hard copy or electronic format (pdf) written to CD.

Where the *Employer* currently holds IOMs and work has been carried out which involves changes to the installed equipment, then the original IOMs shall be replaced by an updated version by the *Contractor*. This shall incorporate any part of the existing IOMs which are still applicable. In the event that IOMs are not available then the *Contractor* shall be responsible for the provision and submission to the *Employer*.

The IOMs for each Overhead Line route (or part thereof), shall contain the following information:

- i) Type, code number and description of all plant erected, together with names and addresses of each manufacturer,
- ii) Methods of assembly of all fittings,

- iii) Method of replacing any part of the plant including the use of maintenance holes provided on the support, access provisions and, where appropriate the application of 'live-line' maintenance techniques,
- iv) Recommendations for preventative maintenance including frequency of inspections,
- v) List of recommended maintenance equipment with a description of its use and limitations,
- vi) Type and application of temporary earthing equipment, and
- vii) Personal safety equipment requirements and any risk assessments required.

Drawings and diagrams shall be used where necessary to enable the *Employer* to maintain the Site on completion of the Works.

The manual(s) shall be in an electronic format and shall form part of final records.

### **7.10.5 Asset Technical Data and Financial Reporting**

The *Contractor* shall be responsible for providing to the *Employer* both Technical and Financial information for all assets that are provided, modified or removed, as detailed in UKBP/TP221 – Technical Data Process and Assurance, UKBP/TP106- Equipment Commissioning & De-Commissioning and UKBP/TP500 – Network Development Process.

This area is covered in more detail in UKBP/TP106 Commissioning & De-Commissioning and contains specific forms and schedules relating to different Plant and Material (post commissioning defined as equipment) groups i.e. OHL, HV Cables and Substation. The following includes the major elements of required data but is not limited to:

#### **a) Asset Data Template (ADT)**

Twelve (12) weeks after the Contract Date the finalised Design Intent Document (DID) shall be signed and frozen as per the requirements of UKBP/TP188. The *Contractor* shall provide design drawings and documentation to support the population of Asset Data Template (ADT) as per requirements of UKBP/TP221.

#### **Technical Data Workbook (TDW)**

The *Contractor* shall submit the Technical Data Workbook (TDW) to the *Employer* by completing the contract specific TDW. The TDW and supporting documentation shall be provided to the *Employer* no later than six (6) weeks prior to the Equipment, Plant or Infrastructure being Available for Commercial Load (ACL) or being Operated, Utilised or Occupied by the *Employer* as per the requirements of UKBP/TP221.

#### **b) Asset Financial Data**

The *Contractor* shall submit Asset Financial Data to the *Employer* by completing the contract specific Fixed Asset Confirmation Certificate (FACC) or equivalent asset listing. This shall be submitted to the *Project Manager* no later than twenty (20) days following Plant being Available for Commercial Load. The submission of Asset Financial Data shall be provided at each distinct commissioning phase unless otherwise agreed by the *Project Manager*.

### **7.10.6 Project Handover Documentation**

The *Contractor* shall be responsible for providing, for each work element, project handover documentation in accordance with the relevant Transmission Procedures.

The *Contractor* shall, where practicable, ensure that all documentation is provided in an electronic format (i.e. pdf, dwg, etc.) and be produced in the English Language. Where it is not practicable, the *Contractor* shall seek agreement from the *Project Manager* that the documentation can be submitted in hard form. This documentation shall be of a quality that is suitable for digital scanning and provided in ring binders (four hole types).

Project hand over documentation will be as defined in the *Employer's* Network Development Process (NDP – UKBP/TP500) and Transmission Procedures.

#### **7.10.6.1 Additional Requirements for Final Records**

##### **OHL and HV Cable Site Access Maps**

The *Contractor* shall maintain a set of maps covering the complete line route upon which are marked site access routes.

The map shall be sufficiently detailed to make clear any restrictions or requests that may apply to the use of these accesses. The maps can be supplemented with a table explaining in greater detail the restrictions applicable to any access together with any other pertinent information. Sketches should also be produced if they would further clarify any access situation.

The maps shall be kept updated throughout the progress of the Works and copies supplied to the *Employer* each time a new revision is produced.

##### **OHL and HV Cable Proximity Schedule of Underground Services**

The *Contractor* shall be responsible for maintaining, throughout the Works, a proximity schedule showing all relevant underground features in close proximity to the line route. Where applicable this information shall be shown on the site access maps.

##### **OHL Route Maps**

The *Contractor* shall record on a set of the latest issue of Ordnance Survey Maps of approved scale such particulars as will allow an accurate reference to be made afterwards in case of any projected modifications to the line.

The map sheet shall show the exact position of every support with approved reference marks. The maps shall be supplemented, unless profiles are marked, by sketches where necessary, to delineate boundary positions of supports which cannot be clearly indicated on the maps. Tower numbers, including route ID codes, shall be added adjacent to each tower, including a note indicating if a fibre optic joint box is mounted upon it.

When any map has a substation located upon it this should be shown accurately and its name / voltage added. When any line reaches the edge of any map sheet, then the name and direction of the next Substation along the line shall be shown. This shall include all lines recorded by OS except that lines belonging to other authorities shall state owner's name only.

Requirements above apply equally to both new and existing line routes.

##### **OHL Line Schedule(s)**

The *Contractor* shall submit to the *Project Manager* a line schedule, in Microsoft Excel format, for each line route or circuit, which summarises the route/circuit information and provides such details as:

- Tower number,
- Type and height;
- Earthing systems
- Foundation type, depth (if piled),
- Insulator sets, and
- Conductor fittings, etc.

The *Contractor* shall be responsible for providing an OHL Line Schedule(s), during the Detailed Design Stage, to the *Project Manager* for acceptance. Any updates/changes to the schedule will require that the *Contractor* re-submits the schedule to the *Project Manager* for acceptance.

The *Contractor* shall be responsible for ensuring that any relevant data entered upon any existing line schedules has been checked for accuracy and transferred to the new schedule. Additional data shall be included as necessary.

The new line schedule format shall also include elements previously included upon summary sheets, which are to be discontinued once data is transferred over.

### **OHL Profile Drawings**

The *Contractor* shall be responsible for ensuring that the line profiles for an OHL route/circuit generated from the PLS CADD model are provided to the *Employer* on completion of the Works.

### **OHL Tower Earthing Systems**

Where special tower earthing arrangements are required, the *Contractor* shall be responsible for ensuring that fully dimensioned drawing(s) indicate all component parts of the system, manufacturers and materials. This shall include details of the method and placement of these earthing arrangements.

### **OHL Foundation Plans and Details**

The *Contractor* shall be responsible for the production of all foundation drawings and design documents in accordance with the *Employer's* Technical Specifications and Procedures.

Whenever new foundations or refurbishments are installed, foundation setting dimensions shall be measured and presented in a tabular format. The table shall indicate for each tower the following information:

- i) Tower type and extension,
- ii) The back to back setting dimensions (at the top of the stubs) both actual and specified on the face and diagonal,
- iii) The relative level of the stubs,
- iv) Stub rake and twist,
- v) If required the absolute level of stub A,
- vi) Excavation record/soil conditions encountered, and



vii) For T pylons, the top level of the flange of the foundation interface piece shall be recorded.

Where stub setting dimensions etc. are outside the permitted tolerance and agreed remedial measures have been undertaken a record of these measures shall also be included. All installed foundations shall comply with the requirements of TS3.4.15.

For piled foundations pile length and size shall be recorded.

## **OHL Tower Footing Resistance**

The *Contractor* shall provide footing resistance measurement readings for each tower on any line (or circuit) which shall be presented in a tabular format. The table shall provide the following information:

- The resistance for each tower with the standard earthing system(s) installed and, where appropriate, those where additional earthing has been added,
- A description of the method(s) of resistance measurement, the instrument identification number, manufacturer and when last checked for calibration/accuracy,
- Details of the type of earthing system(s) installed at each tower and to which leg, or legs, they are connected.

The *Contractor* shall consider inclusion of sketches to provide a clearer explanation of how the measurements were taken.

## **OHL Insulator Sets, Conductor and Earthwire Systems (Including OPGW)**

The *Contractor* shall be responsible for the provision of fully dimensioned route specific insulator set, conductor and earthwire sub system drawings which shall form part of the final records. Drawings shall be based on the Type Registered solution and shall make reference to the allocated EGI code.

## **OHL Wire Clearance Diagrams**

The *Contractor* shall provide generic wire clearance diagrams for each tower type used on the Works where they do not already exist.

In the case of terminal, tee-off or junction towers, a site-specific clearance diagram shall be provided for the actual conditions of installation. Each circuit shall be identified clearly to prevent misunderstanding.

All items comprising the arrangement shall be listed in full together with details of the quantity, manufacturer, material, drawing numbers etc., unless these are fully covered elsewhere. In this case a cross-reference to the source shall be given instead. Where not specifically provided for elsewhere, copies of all drawings shall be submitted.

Down-lead arrangements shall also be provided and these shall include the connection onto the substation equipment or sealing end platform as appropriate including any cable support steelwork.

Included on each wire clearance diagram shall be details of the insulator set length, conductor type, the stringing basis, and a table of clearances.

The jumper loop shall be shown together with details of any insulator strings, counterweights, jumper stiffeners, joints and spacers. The minimum bending radius and / or stiffness of the conductor shall be taken into account when preparing the shape of the jumper loop. Swung jumper loops shall be shown



by dotted line. The type of jumper terminal, i.e. straight or 30° angle shall be included. Any other items used e.g. quad to twin connector plates, shall also be shown.

The 3-D model used to develop the wire clearance diagrams shall also be submitted as part of the Final Record to facilitate ease of future amendments.

### **OHL Site Records**

The *Contractor* shall be responsible for maintaining, throughout the Works, record sheets covering various checks in accordance with their Site Quality Plan and Inspection and Test Plan to be carried out during the foundation installation, tower erection and conductor stringing activities.

In addition to the paper copies required above, the *Contractor* shall provide electronic copies including an index, for transfer into the *Employer's* database.

#### **7.10.6.2 Health and Safety (H&S) File Information**

The *Contractor* shall develop and manage all necessary Health & Safety File information in accordance with UKBP/TP137, including the remaining hazards identified in the Hazard Register (in accordance with UKBP/TP188) and ensuring suitable documentation is available for handover to the *Employer*.

All such information shall be included within the Handover Documentation/Health and Safety File in accordance with the requirements of the Contract and UKBP/TP137 respectively

### **7.11 Meetings**

The *Contractor* shall report on quality matters at Monthly Progress Meetings or as otherwise agreed. The *Contractor* shall note that 'ad-hoc' Quality Review Meetings with the *Employer's* quality representative may be held at other times during execution of the project.

As a minimum the following meetings shall be held.

#### **7.11.1 Pre-Construction Information (PCI) Review and Principal Designer (PD) Handover Meeting**

The *Contractor* shall note that under the requirements of UKBP/TP137 a PCI review and PD Handover Meeting shall be convened and chaired by the principal designer representative (Pre Contract), to ensure formal handover of duties from the Principal Designer (Pre Contract) to the Principal Designer (Design and Build) . This meeting shall be held within two (2) weeks of the Contract Date.

#### **7.11.2 Pre Site Start Meeting**

The *Contractor* shall be responsible for convening and chairing the Pre-Site Start SHE Meeting (a minimum of six (6) weeks prior to site access), for final review of Construction Phase Plan and to determine any changes in site conditions/requirements.

The *Contractor* shall be responsible for convening and chairing all subsequent Pre-Site Start SHE Meetings with all subcontractors, Third Parties and Others undertaking work within the *Contractor's* work areas (CDM Zones) a minimum of six (6) weeks prior to their work/task activities commencing at Site.

The model Site (Weekly) SHESQ&P Meeting agenda shall be utilised for this meeting which is provided in UKBP/TP163 Appendices.

### **7.11.3 Site (Weekly) Safety, Health, Environment, Security, Quality & Programme (SHESQ&P) Meeting**

The *Contractor* shall be responsible for convening and chairing the Site (Weekly) SHESQ&P Meeting. The model Site (Weekly) SHESQ&P Meeting agenda is provided in UKBP/TP163 Appendices. All agenda items shall be considered for discussion at the meeting by the *Contractor*.

### **7.11.4 Contract Progress Meetings**

These meetings are convened and chaired by the *Project Manager*, held at monthly intervals, with the *Contractor*, relevant project personnel and Third Parties, as required. This could typically include key personnel such as the *Contractor's* Site Manager, Programmer, Designers, Construction Interface Engineer Quality Advisor Safety Advisor and Quantity Surveyor.

### **7.11.5 Design Review & Hazard Review Meetings**

Design and Hazard Review meetings shall be an integral part of the design process.

The *Contractor* shall be responsible for ensuring that the requirements defined in UKBP/TP188 are fully complied with.

### **7.11.6 Commissioning Panel Meetings**

Commissioning Panel Meeting shall be convened and chaired by the Commissioning Panel Chair (CPC) in accordance with UKBP/TP106.

The *Contractor* shall be responsible for ensuring that attendance for the commissioning panel meeting fully complies with the requirements of UKBP/TP106.

### **7.11.7 UKBP/TP153 Co-ordination Meetings**

UKBP/TP153 co-ordination meetings shall be convened and chaired by the UKBP/TP153 lead in accordance with the requirements of UKBP/TP153.

The *Contractor* shall be responsible for ensuring that attendance for the coordination meeting fully complies with the requirements of UKBP/TP153.

### **7.11.8 Post Project Review Meeting**

The post project review meeting shall be convened and chaired by the *Project Manager* prior to project closure in accordance with the requirements of UKBP/TP500.

The *Contractor* shall be responsible for ensuring that attendance for the project review meeting fully complies with the requirements of UKBP/TP500.

### **7.11.9 Other Meetings**

#### **Inaugural Contract Meeting**

Following the Contract Date the *Project Manager* will arrange an inaugural meeting which the *Contractor* shall attend.

### **Commercial Meetings**

Commercial issues shall be discussed at the Progress Meeting however the *Contractor* shall note that 'ad-hoc' commercial meetings may be held in execution of the Contract.

### **Third Party Liaison Meetings**

These meetings may be held on a monthly basis with external parties if deemed necessary.

## **8 Health, Safety, Environmental and Sustainability**

This section addresses safety, health, environment and sustainability (SHES) issues and is intended to convey information provided by the *Employer*, Principal Designer, the *Contractor*, their Subcontractors and Others during the course of the project lifecycle. The *Employer's* requirements are supplementary to the requirements of legislation.

The *Contractor* shall work, as a minimum, in accordance with industry standards for SHES as set by the regulators, including the Health and Safety Executive (HSE), Environmental Regulators, Competent Authorities, and Industry bodies. The *Contractor* shall apply, as a minimum standard, the guidance provided in HSE Approved Codes of Practice and HSE Guidance and Environment Agencies guidance.

The *Contractor* shall apply industry and the *Employer's* good practice and standards at all time as referenced in Appendices C.1 and C.2. Where this cannot be achieved the *Contractor* shall make clear to the *Project Manager* why this cannot be met.

### **8.1 General Requirements**

The *Contractor* and their subcontractors shall comply with the *Employer's* Safety and Well-being Policy and Environment Policy. These can be found on the National Grid Engineering document EXTRANET and Appendix B.1 & B.2.

The *Contractor* and their subcontractors shall comply with the *Employer's* Golden Rules. These set the principles of safety to all involved in the lifecycle of the Works, from planning through to construction to Commissioning and Handover. The Golden Rules do not introduce new policies or procedures but reinforce good safety standards and culture.

The *Contractor* shall actively promote and develop a robust SHES culture amongst their staff, design team, survey teams, specialist service providers and suppliers engaged on the project throughout the duration of the Contract. The *Contractor* shall document and communicate these arrangements within the Construction Phase Plan. This shall include for example the use of targets and objectives, behavioral safety initiatives, campaigns and good practice; but shall always capture the *Employer's* minimum requirements stated within the Works Information.

Prior to the commencement of the Works, the *Contractor* shall set out the arrangements for managing health, safety and welfare for all those carrying out the Works (and all those affected by it) and for minimising and controlling the potential environmental impacts of all work activities. The *Contractor* shall be required to develop a project SHE Charter in agreement with the *Project Manager* and the Electricity Transmission Occupier's representative prior to site mobilisation.

The *Contractor* shall have an Environmental Management System (EMS) certificated to ISO 14001:2004 or 2015, or equivalent standard. All subcontractors not certified to ISO 14001 shall work to the *Contractor's* ISO 14001 standards.

The *Contractor* shall have an Occupational Health and Safety Management System (SMS) UKAS certificated to OHSAS 18001:2007, or equivalent standard. All subcontractors not certified to OHSAS 18001 shall work to the *Contractor's* management system standards.

The *Contractor* shall ensure that the scope of their ISO 14001 EMS and OHSAS 18001 management systems are extended to cover the Works. If the scope is not sufficient, the *Contractor* shall ensure the Works is included under the *Contractor's* certification to ISO14001 and OHSAS 18001 and that this is confirmed by a UKAS accredited body within the first six (6) months of construction on Site. The *Contractor* shall provide a valid certificate that confirms the scope of the Works to demonstrate compliance.

The *Contractor* shall provide to the *Project Manager* their preparation arrangements for Site mobilisation and enabling works prior to the Works commencing.

This shall include, but not be limited to, the application of the following areas:

1. SHES management system is sufficiently developed and implemented to enable works to start,
2. Suitability of Welfare arrangements for the Works and its requirements,
3. Subcontractor management arrangements specific to the Works,
4. Project Specific Induction Process,
5. Occupational Health Arrangements specific to the Works,
6. SHES Assurance and compliance plan specific to the Works and risk,
7. Key SHES risk registers established and suitable for the Works to start,
8. Compliance to SHES elements of the contract,
9. Avoidance, or if not practicable, reduction and control of health and safety hazards and risks,
10. Identify and record of the key design issues,
11. Communicating hazards, risks and control,
12. Compliance with all relevant legal, regulatory and *Employer* requirements, and
13. Continually monitor and improve the health, safety and environmental performance.

When developing work specific arrangements and documentation, the *Contractor* shall identify the hazards and assess the risks for each of the key stages of the Works, including but not limited to those identified in this section. The arrangements for managing SHES shall be reviewed on a regular basis and these arrangements shall be amended and updated as a result of hazard identification, risk assessments, mitigation and methods of working proposed. Reviews of the arrangements and documentation shall also be made if there are, for example, design changes, unforeseen circumstances, preferred build methods and operational constraints. It is vital that such changes are notified to all those working on the project.

The *Contractor* shall endeavour to implement all National Grid examples of good and expected practices. The *Contractor* shall liaise with the *Project Manager* to determine which safety good practices shall be adopted (or not) during construction. Records shall be kept to document and justify decisions made for inclusion or non-inclusion of good practices. A copy of National Grid Good Practice Handbook, Expected Practice Guidance Handbook and Sustainability Good Practice Handbook can be found in Appendix C.1, C.2 C.3 and on the SHES corporate memory Huddle.

Any new good practices shall be captured and submitted on a one page document, with additional information as required in accordance with the process in Appendix C.5. Any implementation of an existing good practice shall be captured and submitted in accordance with the process in C.6.

### **8.1.1 Safety Leadership**

The *Contractor* shall appoint a Director or a nominated senior representative to attend the National Grid SHES Leadership Forum. The *Contractor* shall also provide a Senior Management representative to participate and attend the National Grid Senior Leadership site tours.

The *Contractor* shall develop a Programme for Senior Management SHES inspections.

### **8.1.2 Communication and Consultation**

The *Contractor* shall establish processes to ensure employees and sub-contractors are consulted on matters of safety, health, environment and sustainability (SHES). This shall include participation in SHES meetings as appropriate. The *Contractor* shall ensure that feedback is circulated to the workforce and two way communication is effective and consultation arrangements are implemented.

Safety stand-downs, method statement briefings and tool box talks are good opportunities to engage, consult and communicate with operatives on matters of H&S.

### **8.1.3 Health, Safety and Environment Notice Boards**

The *Contractor* shall erect in prominent positions accessible to all personnel, including at the point of work, health, safety and environment notice boards.

Notice boards in the Site offices, the canteen facilities and the transient 'mess' facilities shall be required as a minimum. As per good practice, the notice boards shall be legible, relevant and display as a minimum:

- Health and Safety Law poster workforce telephone/online contact details for safety matters,
- F10 Project Notification Form,
- The fire and emergency procedures; emergency telephone numbers,
- Safety bulletins promotions and campaigns,
- first aid information,
- Project Performance Triangles,
- The Golden Rules,
- Hazard cards with adjacent drop-box,
- Sensible Monitoring,
- Drainage Plan, and
- Emergency Plan.

### **8.1.4 Employer's Safety Communication**

The *Employer* shall forward to the *Contractor* regular safety alerts/bulletins, safety promotions and campaigns. The *Contractor* shall brief all relevant information to the design team, survey teams, Site workforce, Site personnel, and all project based managers and supervisors. A record shall be maintained for all briefings given. It is a mandatory requirement for the *Contractor* to brief out the latest

version of National Grid's banned items – available on the National Grid Construction SHES Corporate Memory on Huddle and within Appendix D of this works information.

## 8.2 SHE Management Plans

Prior to the commencement of the Works on Site, the *Contractor* shall develop a Construction Phase Plan (CPP) and a Project Environmental Management Plan (PEMP) in accordance with UKBP/TP137 and UKBP/TP215 respectively. The plans shall identify and provide mitigation for SHES risks associated with the Works. This shall include, but not be limited to, the risks identified in the Works Information/Site-specific Information provided by the *Employer* to the *Contractor*, including *Employer* standards and specifications. This information shall be supplemented with additional site information that may come to the *Contractor's* attention during delivery of the Works.

The *Contractor* shall develop and submit the CPP and PEMP within twenty-eight (28) days of the Contract Start Date to the *Employer* for review and acceptance. The plans shall be implemented from the Contract Date and shall be continually reviewed. The plans shall be reviewed monthly (as a minimum) by the *Contractor* to ensure it remains current; it shall be modified in the event of changing circumstances, such as (list is not exhaustive):

- Changes to site hazards and risks,
- Changes to environmental aspects and impacts,
- A change to working methods or controls with the potential to impact on the environment,
- Changes to resources and personnel,
- Amendments to reflect progress against the programme,
- Significant design changes,
- Operational constraints or enforcement notices,
- A significant unforeseen circumstance or event,
- Decommissioning or demolition works associated with the Works,
- Commencement of commissioning activities and/or
- Commencement of outstanding and demobilisation works.

The *Contractor* shall review the arrangements for managing SHES issues to ensure that the requirements of legislation and this document shall be effectively and efficiently implemented throughout the Works. The *Contractor* shall, as a minimum, comply with the *Employer's* Environmental Management System standards.

Project specific SHES objectives and targets shall be agreed between the *Employer* and the *Contractor* for inclusion in the Construction Phase Plan (CPP) and the Project Environmental Management Plan (PEMP). As a minimum, the objectives and targets shall take into account those identified within section 8.12. The *Project Manager* shall ensure that adequate measures are agreed with the *Contractor* to the achievement of project objectives and targets. Progress towards the SHES objectives and targets shall be monitored, measured and reported by the *Contractor* on a monthly basis to the *Employer*; they shall be reviewed on an annual basis and the *Contractor* shall be aware that the targets are subject to change.



Role descriptions, responsibilities, authorities and duties of the *Contractor's* project team shall be incorporated into the Construction Phase Plan.

The Construction Phase Plan and Project Environmental Management Plan shall be used to develop the corresponding Health & Safety File and Environmental File that will be used as a record of information for the *Employer* and Operator to focus attention on those safety and environmental aspects and impacts that will need to be considered during maintenance, repair or further construction works, operations, decommissioning and abandonment of plant. A template for development of an Environmental Aspects and Impacts Register can be found in Appendix E of this works information. Contents of the handover documents shall be in compliance with the requirements of UKPB/TP137 and UKBP/TP215.

### **8.2.1 Health and Safety Handover Records**

The *Contractor* shall develop and manage all necessary Health & Safety File information in accordance with UKBP/TP137, including the remaining hazards identified in the Hazard Register (in accordance with UKBP/TP188) and ensuring suitable documentation is available for handover to the *Employer*.

### **8.2.2 Environmental Handover Records**

The Environmental File is a record of information for the *Employer* and operator that focuses on environmental aspects and effects that will need to be dealt with during maintenance, repair, further construction works, operations, decommissioning and abandonment of Plant. The contents of the Environmental File form the main part of the environmental handover documents.

The *Contractor* shall liaise with the *Employer's* Environmental Representative regarding the specific content and format of the Environmental File and indexing system throughout the project lifecycle.

Typical contents of the Project Environmental File are as follows (list is not exhaustive):

- Current version of the Project Environmental Management Plan and Site Waste management plan,
- "As built" Carbon footprint,
- Environmental studies and surveys,
- Archaeological finds/surveys reports,
- Information on Biosecurity issues,
- Consents,
- Planning Consents,
- Consents to Discharge,
- Trade Effluent Consents,
- Waste Management Licenses,
- Agreements on noise measurements,
- Other (Identify),
- Organisations consulted,
- Records of consultations,
- Details of Environmental Design Features,
  - This section shall include design features installed to minimise environmental impact. For example using landscaping around a completed operational site to minimise visual impact; or fuel efficient installations.



- Details of environmental control equipment fitted,
  - This section describes environmental control equipment installed on the final asset. For example interceptor bunds on the drainage system, oil detector pumps.
- Water Management Plan,
- Emergency response procedures,
- Environmental control procedures,
- Details of all environmental complaints and actions taken,
- All incident reports,
- Results of environmental monitoring (e.g. noise monitoring),
- The *Contractor's* environmental method statements,
- Environmental aspects and impacts register, and
- Controlled Waste Transfer Notes (CWTNs) and Hazardous Waste Consignment Notes (HWCNs),
  - Only include ones which are required to be kept under the legislation *i.e.* CWTN must be kept for two (2) years and HWCN must be kept for three (3) years.

### **8.3 Method statement, Risk Assessments and Safe Systems of Work**

The *Contractor* shall set out their approach to hazard and risk management in the Construction Phase Plan and demonstrate that every opportunity to influence and mitigate risk through the project has been considered. The *Contractor's* project management team shall undertake a Key Hazards Review as soon as practicable prior to commencing the Works; this shall be agreed with the *Project Manager*. All the agreed key hazards and significant risks shall be entered onto the Hazard Register as per UKBP/TP188.

In accordance with legislation, workplace hazards shall be identified and be subject to risk management and assessment. The *Contractor* shall be required to produce suitable and concise Risk Assessments and Method Statements (RAMS) for all the Works and monitor their implementation. The *Contractor's* employees and sub-contractors shall be consulted on the identification of risks and in the preparation of risk assessments where appropriate. RAMS shall be well briefed to the workforce in a succinct and understandable manner. UKBP/TP163 stipulates the requirements including the timescales that shall be complied with in the preparation, agreement and dissemination of RAMS.

The procedures used shall be subject to the hierarchy of controls of eliminate, reduce, isolate, control and communicate with regard to hazards and risks that shall affect health and safety during the build, operation, maintenance and decommissioning/demolition of the asset.

The National Grid UK Electricity Transmission Safety Rules (NSI) shall apply for undertaking activities within an HV Operational Substation or Overhead Line Area. The Safety Rules are mandatory and can be found on the National Grid Engineering document EXTRANET to ensure Safety from the System.

When work is to be undertaken within an HV Operational Substation Area, a Senior Authorised Person shall assess the means of achieving Safety from the System. The issue of a National Grid Safety Document establishes and defines the Safety from the System requirements only; it does not relinquish the requirements of the *Contractor's* Work Permit Management Systems.

All Competent Persons authorised in accordance with NSI's, shall only undertake/supervise works where they are authorised to do so, in accordance with the National Safety Instructions.

Under no circumstances shall work be undertaken that is not defined within the National Grid Safety Document. Additionally, all work defined in the National Grid Safety Document shall be carried out within the Safety from the System demarcation established for that document.

The *Contractor* shall also identify and assess environmental risks. When establishing site depots and work areas, the *Contractor* shall minimise risk by meeting, as a minimum, the guidance set out in National Grid Environmental Guides No.1-4 NGUK/PR/SHE/77 to NGUK/PR/SHE/81.

The *Contractor* shall identify all overhead hazards by survey and consultation with the relevant utility owner including, but not limited to, low slung cables, areas congested with cables, multiple crossing of cables, pipe crossings below cables, running close and parallel to cables.

The *Contractor* shall ensure all overhead hazards associated to the project and local traffic routes are recorded on a suitable Overhead Hazard Register.

Throughout the Works, overhead hazards shall be avoided, realigned or diverted where necessary. Where such hazards cannot be avoided, mitigation and control measures shall be developed and proposed for implementation such as raising the cables, sleeving, restricting build work/activities, and temporary isolation of supply or permit to cross. Risks in the movement of equipment and their operators, the movement of permanent and temporary materials and the failure to implement suitable/sufficient controls shall be considered.

For all overhead cable that are to be crossed, and for those running parallel in close proximity to the Site, a specific risk assessment shall be undertaken and recorded for each cable by the *Contractor*. The assessment shall include, but not be limited to, the following:

- Consultation outcomes and agreements with the utility owner,
- Cable support locations and condition,
- Ground profiles and ground conditions,
- Seasonal and loading changes affecting the overhead cable,
- Height and risks of height changes,
- Restrictions and safe working clearances, and
- Equipment and vehicle types that are to cross and other associated hazards in the cable crossing locale.

### **8.3.1 *Contractor's* Work Permit Management Systems**

The *Contractor* shall be responsible for the provision, maintenance and implementation of their own Safe Systems of Work (SSOW) to ensure that all personnel employed to undertake work/task activities at Site, do so without risk to their health and safety and to that of others.

The *Contractor* shall take note that the issue of the *Employer's Safety from the System* documentation does not remove the responsibility of the *Contractor* for establishing Safe Systems of Work.

In setting personnel to work the *Contractor* shall ensure that the SSOW processes/procedures are developed, maintained and implemented throughout the project's site installation delivery phase. This shall include, but not be limited to, a Work Permit Management System.

The *Contractor* shall be responsible for the control of a work permit management system which details the control of known potential hazard (where these, practicably, cannot be eliminated) and safety systems of work required in undertaking the specified activity.

The Work Permit Management Systems shall be enacted by a competently trained person/(s) with specific management authority to formally issue work permit documentation.

The *Contractor* shall be responsible for ensuring suitable safe systems of work are developed, implemented and monitored for all activities associated to the survey works and on construction sites.

Permit to Work systems and procedures are implemented where survey works, construction works or places of work are deemed high risk and require an additional level of management and control.

The *Contractor* shall be working under their own permitry within the *Contractor's* CDM area, where permitted by the Site owner; works outside this area will need to be covered by the additional National Grid Site permitry requirements.

The *Contractor* shall implement their Safe Systems of Work or Permit to Work system and compliance monitoring to Works including, but not limited to, the following:

- Trial holes to locate buried utility services,
- Crossing of buried utility services – including construction vehicles,
- Crossing under overhead cables / utilities – including construction vehicles,
- Use of harnesses when working at height,
- Working in close proximity to and in a confined spaces,
- Special crossings that are high risk – such as in a flood plain,
- Temporary works installation and removal,
- The discharge of ground and surface water – to land, sewers, drains & watercourses,
- Works in a demarcated area within an operational Site,
- Access to and work on 'live' electrical systems,
- Working near or over water,
- On-Site radiographic work, and
- Hot Works.

It should be noted that although the *Contractor's* Work Permit System Management process is designed to assist in controlling hazards from specific task/work activities, it shall be utilised in addition to, any **Safety from the System** documentation issued by the *Employer*.

### **8.3.2 The use of Radio Detection Cable Avoidance Tool**

The *Contractor* shall establish a dedicated Cable Avoidance Tool (CAT and Genny) area for testing and calibration of the equipment. The test area shall be sited in a safe location away from the construction works and contain known services for detection. Where suitable existing services are not present, the *Contractor* shall install a range of services within the test area. The test area shall be used as necessary for operator capability checks to be undertaken and training. All testing (daily or otherwise) shall be recorded immediately on completion of the test on a suitable test sheet and retained at the test area or review and monitoring purposes.

### **8.3.3 Excavations**

The *Contractor* shall ensure that SSOW are developed for all excavations and that all excavations are regularly inspected and assessed in accordance with legislation, the requirements of method statements and risk assessments, and additional guidance such as: - HSE Guidance, temporary works standards; CIRIA Note RO97; the Confined Space Regulations; and Construction (Design and Management) Regulations. The results of all inspections shall be made available to the *Project Manager*, or their nominee.

A suitable, safe and secure means of personnel access/egress shall be provided by the *Contractor* into all excavations.

Proprietary access/egress systems and designed temporary access systems are the preferred over ladders. Ladders laid to the side wall of the excavation shall only be used where demonstrated by risk assessment to be the best option.

Trench boxes must be used strictly in accordance with the manufacturer's recommendations and shall not be used as a means to take full ground loadings of the excavation.

Bespoke trench boxes can only be incorporated as temporary works when a full specification, with calculations, permitted loadings and material certification, for installation, usage and removal are assessed as part of the temporary works calculations.

## **8.4 Training and Competency**

The *Contractor* shall ensure that procedures and systems are in place to manage and record the competence of their employees including agency workers. Procedures shall include provision for changes in legislation and periodic review of individual competence. The *Contractor* shall ensure that any changes to individual roles and responsibilities during the Works are reviewed and captured as part of the competency management process. This assessment of competence shall be documented in a procedure, recorded in an assessment and made available for review by the *Employer*.

The *Contractor* shall allow the *Project Manager*, or their representative, access to review the training records and register at any time.

The *Contractor* shall clearly define arrangements for communication of environmental and sustainability issues with their subcontractors and the *Employer's* Environmental Adviser. Refer to NGUK/SHE/212 for guidance on the *Employer's* minimum standard environmental training requirements, as included within the *Employer's* Policies, Procedures and Specifications.

The *Contractor* shall ensure that subcontractors meet the *Employer's* training and competency requirements. The *Contractor* shall ensure that person(s) working on their behalf are trained and competent for the tasks which they are undertaking and are responsible for. Refer to UKBP/TP/137 and NGUK/SHE/212 for further guidance.

The *Contractor* shall be responsible for providing and recording induction training for all staff including subcontractors at the commencement of and throughout the Works. The *Contractor's* Induction Training shall include clear details of project specific safety, health and environmental issues.

In addition to the induction, all relevant safety, health and environmental information shall be communicated to the personnel undertaking work/task activities at site by one (or more) of the following means:

- Toolbox Talks,
- SHE Bulletin Briefings,
- Daily Briefs and/or
- Working Party Briefings (RAMS and Work Permit documentation).

All personnel attendance shall be formally recorded, details of which shall be kept throughout the duration of the Works.

The *Contractor* shall carry out or ensure Tool Box Talks are undertaken. Tool Box Talks shall be given to all those working on Site, including those from employment agencies and other subcontractors. The *Contractor* shall keep a record of attendance for all Tool Box Talks held. The implementation of Tool Box Talks shall be incorporated into the Construction Phase Plan. Tool Box Talk procedures, record forms and topics shall be held in site folders.

All supervisors working for, or on behalf of, the *Contractor* shall have attended EUSR-accredited Front-Line Leaders training, or equivalent.

The *Contractor's* competence management procedures and systems shall be subject to both internal and *Employer* audit and inspection throughout the Works. The *Contractor* shall ensure that competence records are accessible at all times at the relevant work location (i.e. local to where the work activity is being undertaken), for review and audit as required by the *Employer's* representatives.

The *Contractor* shall evaluate and assess the nature and complexities of the Works and identify any training requirements needed to mitigate and manage unique and difficult hazards and risks; for example, identifying and providing the necessary training requirements for new plant and materials and/or any new solutions that are offered, including an overview of how any new plant and materials will interface with existing systems on Site. The *Contractor* shall arrange and deliver specific training packages and material for these unique and difficult risks to any person or worker on the project (regardless of their means of employment) exposed to these risks during the course of their duties.

#### **8.4.1 Training and Competency of the *Employer's* Staff**

The *Contractor* shall be responsible for the provision of training *Employer's* staff for all new technologies implemented in their design solution as required by the Technical Specifications and agreed within the commissioning panel meeting minutes.

### **8.5 Hazardous Substances and Occupational Health**

The *Contractor* shall ensure arrangements for managing the Occupational Health of the workforce are developed by the *Contractor* prior to commencing the Works.

The *Contractor* shall ensure that in preparing Risk Assessments and Method Statements (RAMS) they take into account the precautions for health hazards commonly associated with construction sites particularly for those undertaking the Works that have a medical condition or are taking medication. The

*Contractor* shall determine welfare arrangements specific to the type and duration of Works being undertaken.

The *Contractor* shall nominate a person within the team to manage the Control of Substances Hazardous to Health (COSHH). This person shall identify all substances used or substances that persons may be exposed to. Manufacturers Safety Data Sheets (MSDS) shall be obtained and a COSHH assessment sheet must be produced for each product. The assessment will depend on the application, environment and quantity intended for use. Information shall be recorded in a Substances Register. This information shall be included in the Health and Safety file. Guidance can be found in the *Employer's* procedure for Use of Hazardous Substances NGUK/PM/SHE/209.

The *Contractor* shall ensure compliance with the *Employer's* UK Drugs and Alcohol Policy; this is included on the National Grid Engineering Document EXTRANET. The Policy sets out the requirements for **post incident and reasonable cause** drug and alcohol testing for all personnel delivering work on behalf of the *Employer*, regardless of the employing company.

It is recognised that the drugs and alcohol policies of the *Contractor* may go beyond the minimum requirements set out in respect to testing. This document is not intended to restrict or limit those policies but rather to set a consistent minimum standard. However, the *Contractor* shall not prevent access to Site to the *Employer* or any *Employer's* representative if they are doing so for the purposes of a SHE visit where they will be accompanied at all times.

## 8.6 Sensible Monitoring Site Inspections and Audits

The *Contractor* shall implement a Sensible Monitoring Programme in accordance with their Safety Management Systems to demonstrate compliance with the requirements identified in UKBP/TP163.

The *Contractor* is responsible for inspections and audits in accordance with the arrangements detailed in their OHSAS 18001 and ISO 14001 Environmental Management System or UKAS accredited equivalent. The *Contractor's* proposed schedule of internal and external environmental audits and inspections shall be included in the Construction Phase Plan along with details of arrangements, and submitted to the *Employer*.

The *Contractor's* proposed internal and external audit programme shall be submitted to the *Project Manager* for review. The *Contractor* shall update the audit programme each month to show the status audits and changes to the programme.

The *Contractor* will be advised of those audits that the *Employer* wishes to observe.

A copy of all internal and external audit reports shall be formally issued to the *Project Manager* for review within five (5) working days of completion. Non-compliances from all audits and inspections shall be reported to the *Employer*. The *Contractor* shall demonstrate that non-compliances reported by the *Employer* and from internal audits and inspections are closed-out appropriately within the specified time frame. Processes for monitoring close-out and ensuring that issues and actions identified are communicated to the relevant personnel shall also be outlined in the CCP and PEMP.

The *Employer* maintains an audit Programme in compliance with its own internal processes and its formal ISO 9001 Quality Management System, PAS 55 system and ISO 14001 Environmental Management System. Audits of the *Contractor's* Safety, Quality and Environmental Management



Systems may be undertaken by the *Employer* in relation to this requirement. The *Project Manager* or delegated representatives will conduct site audits as required by the *Employer's* quality system to ensure activities are being carried out in accordance with contract Standards and Specifications. The following areas may be audited, though this list is not exhaustive:

- Corporate audits e.g. OHSAS 18001 ISO14001 and ISO9001,
- Compliance Audits,
- QMS Audits,
- Health & Safety Audits and Inspections,
- Environmental Audits and Inspections, and
- Technical Audits.

The *Employer's* senior management team will undertake periodic safety tours, in conjunction with the attendance and support of the *Contractor's* senior Leadership team or similar representative. These tours seek to ensure that H&S standards, behaviours and systems are of the highest quality and are being implemented. The tours are scored (-3 to +3) as part of the *Employer's* incentivisation and monitoring system. During the tour, members of the senior management team will engage with the Site personnel and may deliver a H&S talk or briefing, these may be pre-planned or on the spot discussions.

## 8.7 Personal Protective Equipment

The *Employer's* Safety Line Policy outlines the minimum Personal Protective Equipment (PPE) to be adopted by all personnel working on the *Employer's* projects and sites. The *Contractor* shall ensure this is complied with. It provides a consistent standard across all construction projects, introduced to reduce injuries and the severity of injuries and to work towards an injury free workplace.

The *Contractor* shall ensure additional and specialist PPE shall be worn for specific tasks and activities as required by risk assessment, legislation and site operator requirements. For low risk activities or certain working environments a risk assessment undertaken by a competent person may identify when certain mandatory items of PPE need not be worn. Any such agreements shall be at the discretion of the *Project Manager* and/or *Supervisor*.

## 8.8 Incident Reporting

All SHES incidents, accidents, near misses and hazards shall be reported and investigated in accordance with NG/UK/SHE/INV1.

All those engaged on the Works are responsible for:

- Bringing any Incidents they identify to the *Contractor's* immediate attention; the *Contractor* shall subsequently inform the *Project Manager*,
- Initiating and/or assisting with immediate containment/remediation measures to the best of their capabilities consistent with ensuring the safety of themselves and others.

The *Contractor* shall be responsible for:

- Reporting all incidents and prohibition, improvement and enforcement notices to the *Employer* immediately and completing a two page flash report if the *Employer* requires,

- Ensuring all incidents are fully investigated and actions taken to prevent recurrence,
- Maintaining a register on Site of all reported incidents, enforcement notices, threats or observations issued by Regulatory Authorities and the action taken to prevent recurrence where appropriate, and
- Compiling and submitting a monthly summary of incidents to the *Project Manager*.

## 8.9 SF<sub>6</sub> Gas Usage and Leakage

SF<sub>6</sub> is used in National Grid's high voltage electricity system for its insulating properties. SF<sub>6</sub> is a greenhouse gas with a high global warming potential. The *Contractor* shall be responsible for minimising leakage of SF<sub>6</sub> equipment during the Works and reporting any leakage in accordance with UKBP/TP229.

## 8.10 Sustainability

The *Employer's* commitment to sustainability is documented in Our Contribution: a copy of which can be found in Appendix F of this works information. In addition, Capital Delivery sets targets to contribute to the company wide targets on carbon, resource use and environmental value, a copy of which can be found in Appendix G.

The *Contractor* shall allow for the targets identified below and demonstrate how they shall be met. Any additional targets that are relevant to the Works shall be identified within the Project Specific Works Information and reported by the *Contractor* to the *Employer* at a frequency and in a format agreed with the *Employer*.

<b>Contractor Targets</b>	<b>Capital Delivery Target</b>	<b>Reporting Frequency</b>	<b>Reporting portal</b>
'As built' Carbon Interface Tool (CIT)	100% reporting on 'As built' CIT	Project closure	Carbon Interface tool (CIT)
Total volume of SF6 to be installed - Design Intent Document (DID)	10% reduction in SF6 released	SF6 volume reported via SCIP – Project commencement	Sustainable Construction Information Portal (SCIP)
Target – 100% of eco-cabins used are band B or above for office and welfare use.	100% eco-cabin use	Reported via SCIP – Project commencement	SCIP
2017/18: 98% total waste diverted from landfill  2018/19 99% total waste diverted from landfill  2019/20: 100% total waste diverted from landfill  2020/2021: 100% total waste diverted from landfill	2017/18: 98% total waste diverted from landfill  2018/19 99% total waste diverted from landfill  2019/20: 100% total waste diverted from landfill  2020/2021: 100%	Monthly	SCIP



	total waste diverted from landfill		
22% secondary aggregate use with 10% increase in usage year on year throughout the project delivery phase	10% increase in usage	Monthly	SCIP

Login details to the Sustainable Construction Information Portal (SCIP) will be provided by the *Employer*.

The *Contractor* shall ensure all reporting measures shall be fully auditable and relevant records stored for the *Employer* to review as required.

**Note:** For the purposes of reporting, secondary aggregates are defined as “by-products of industrial processes that can be processed to produce secondary aggregates. Secondary Aggregates are sub-divided into manufactured and natural, depending on their source”.

Any necessary training on the use of the tools and reporting systems shall be carried out by the *Employer's* sustainability representative.

### 8.10.1 Sustainability Review and Good Practice

Where appropriate, the *Contractor* shall implement sustainable good practice. The *Employer* keeps a library of sustainability good practices:

- The Sustainable Construction Good Practice Guide available in Appendix C.1 and the National Grid Corporate memory site Huddle,
- Additional Sustainability Good Practices are held on the SCIP portal.

During the design works, the *Contractor* shall review and consider all options to improve carbon, resource use and environmental value of construction sites. The *Contractor* shall liaise with the *Project Manager* to determine which good practices should be adopted during construction. This is to be achieved by either 1) a dedicated sustainability review during initial and final detailed design or 2) including sustainability as a standard agenda item in design review meetings. Sustainability reviews shall be conducted throughout the development and delivery of the project in accordance with UKBP/TP188. Regard shall also be given to:

- Use of the MARkit materials efficiency and re-use tool, access to this is through the SCIP portal and login details shall be provided by the *Employer*,
- The *Employers* Guide to The Sustainable Use of Aggregates, included as Appendix H, and
- National Grid Spoil Reuse Decision Tree Appendix I.

Records shall be kept on a sustainability register Sustainability Opportunities Assessment Tool register (SOAT) to document and justify decisions made for inclusion or non-inclusion of good practices, see example in Appendix J.

Any new good practices shall be captured by the *Contractor* in accordance with the guidance in Appendix C.5, C.6. This good practice shall be reviewed by the *Project Manager* and submitted to the *Employer's* sustainability representative for inclusion in the Sustainability Good Practice Handbook.

The *Contractor* shall provide the *Employer* with regular updates of progress towards the close out of actions identified within the SOAT during the design and delivery phase.

### **8.10.2 Mandatory practice**

The *Contractor* shall ensure that all cabins used for temporary accommodation are energy performance rated B or above, or have mandatory energy efficiency features listed in the Sustainable Construction Good Practice Handbook.

### **8.10.3 Carbon Management**

As part of efforts to reduce the emissions to air during the whole life cycle of the Works, the *Contractor* shall refer to NGUK/PM/SHE/210.

Measures to reduce carbon shall be recorded in the Sustainability Register and the Carbon Interface Tool (CIT) or in another suitable form as approved by the *Employer*. Further guidance on carbon and energy management can be found in the *Employer's* Guide No.4 Sustainable Construction of Large Scale projects NGUK/PR/SHE/81.

The *Contractor* shall take into consideration all stages of the Works that have a carbon impact and the associated material/activity. This includes the embodied carbon of the asset as well as the energy used to construct it.

At the start of the project, the *Contractor* shall consider using materials/activities that have a lower carbon impact, for example, energy efficient lighting and low carbon concrete. The *Contractor* shall discuss the use of any lower carbon options and any changes to the design materials, in order to reduce the carbon footprint of the Works, with the *Project Manager* for their acceptance which shall be recorded in the Design Review Meetings.

The *Employer* shall provide the Carbon Interface Tool (CIT) within the Project Specific Works Information. The design information collected through the tool shall be used to calculate the predicted carbon footprint. The *Contractor* shall review the CIT to ensure the proposed carbon reductions are included in the final detailed design. If the options cannot be delivered a deviation shall be discussed and agreed by the *Project Manager* and recorded within the Design Review Meeting.

The *Employer* requires an "As Built" carbon footprint following commissioning. The *Contractor* shall complete the CIT using the template provided in Appendix K and submit it to the *Project Manager* for review and acceptance. The *Contractor* shall confirm with the *Project Manager* that they have the latest version of the CIT.

During the Works, the *Contractor* shall be required to provide information that will be used to update the CIT for the Works to give an up-to-date carbon footprint. The carbon footprint of the asset shall be reported to the *Employer's* Project Review Meetings as required by the *Project Manager*.

### **8.10.4 Management of Waste and Resources**

The *Contractor* shall apply the good practice principles of the waste hierarchy when designing the asset. Guidance on waste management is set out in National Grid's Environmental Guide No.4 NGUK/PR/SHE/81. The guidance covers waste minimisation, site preparation, waste disposal and hazardous waste and the activities involved for each of these during Site set up and day to day management.

Although no longer a legal requirement, a Site Waste Management Plans (SWMP) shall be produced by the *Contractor* in accordance with NGUK/PM/SHE/200 – Management Procedure for Waste Management. The *Contractor* shall initiate the SWMP for the waste that will be produced during the delivery of the Works.

The SWMP shall form part of, or appendix to, the *Contractor's* Construction Phase Plan. The *Contractor* may find it helpful to consider the guidance in the Code of Practice developed by Contaminated Land: Applications in Real Environments (CLAIRE) "A Definition of Waste: Development Industry Code of Practice". This voluntary Code of Practice defines a method, accepted by the Environmental Agency, of demonstrating if a material is a waste or not.

The *Contractor* shall make provision in the design for the correct storage and disposal of hazardous wastes during the detailed design and construction phase. These wastes arise from the definitions in the Hazardous Waste Regulations/Landfill (Scotland) Regulations.

For further guidance refer to the *Employer's* Guide No.4 Sustainable Construction of Large Scale projects NGUK/PR/SHE/81.

The *Contractor* shall be responsible for the security, measurement of weights, recovery of monies and transportation of all salvageable metallic items from point of recovery to point of delivery. The *Contractor* shall institute an 'Open Book' system and keep accurate records and waste transfer notes for all waste material to fully comply with the requirements of current legislation. Where scrap income has been received by the *Contractor*, it must be separately identifiable. The *Contractor* shall identify the income from the scrap value, less the cost to realise the scrap income. The *Contractor* shall reduce the value of the payment application accordingly by the scrap income amount.

The *Contractor* shall ensure that following the decommissioning of PCB contaminated assets the associated PCB Waste Consignment Note is sent with the corresponding Ellipse Asset Number and Functional Position (provided by the *Project Manager*) to the PCB .box (box\_PCB\_consignment\_notes) with this information contaminated assets can be removed from the PCB register and the Environment Agency informed.

The *Contractor* shall allow for the segregation and disposal of all waste in accordance with statutory requirements.

## 8.11 Nuisance

Refer to NGUK/PM/SHE/217 for the management of environmental noise, nuisance and complaints.

The *Contractor* shall ensure that Best Available Techniques (BAT) are used to take all reasonable and practicable measures to reduce the generation and transmission of noise and vibration caused by the finished asset, plant and materials, equipment, site vehicles, pumping equipment, construction activities, temporary works activities and maintenance.

The *Contractor* shall consider the potential for light pollution and mitigate against the effects that it could have on both wildlife and nearby communities. Light sensitive habitats/locations adjacent to the site and/or route shall be identified in consultation with the relevant authorities and stakeholders, and where appropriate, times agreed when artificial lighting can be used or mitigation installed to reduce the impact.

## **8.12 Water Management**

During all phases of the Works the *Contractor* shall ensure the following documents are consulted as a minimum to develop systems to reduce the risk of water pollution:

- CIRIA C648- Control of Water Pollution for linear construction projects. Technical Guidance dated 2006, and
- CIRIA C649- Control of Water Pollution for linear construction projects site guide dated 2006.

The *Contractor* shall provide all information to the *Employer* necessary to undertake a Flood Risk Assessment in accordance with the *Employer's* Procedure PS(T)095 Flood Mitigation Policy. The *Contractor* shall adhere to all requirements of this policy during the design of the asset, and any design changes made during the build phase.

The *Contractor* shall investigate and identify areas where de-watering using pumps is likely to be needed. Notification of these areas to the *Employer* shall be completed in a timely manner so as to allow the *Employer* sufficient time for negotiations with the landowners. These areas shall be marked on the Water Management Plan along with possible and suitable locations for outfall areas.

All pumping activities shall be controlled by the *Contractor* using a Permit to Pump system, an example of which is given in Appendix L.

The *Contractor* shall develop and keep updated a project specific Water Management Plan and drainage plan. Regular liaison with the *Employer's* Environmental Representative is required to ensure that all details in the Water Management Plan are acquired and kept up to date within the template found in Appendix M.

## **8.13 Contaminated Land**

The *Contractor* shall allow for the management of all contaminated land, including waste acceptance testing, segregation and disposal of all contaminated land waste in accordance with statutory requirements.

## **8.14 Concrete**

The alkaline and corrosive nature of concrete and other cement-based products represent a significant environmental aspect with regards to the aquatic environment. The use and storage of cement-based products shall be carried out in accordance with Control of Substances Hazardous to Health (COSHH) requirements and the manufacturer's data sheets.

The *Contractor* shall be responsible for operations using these substances, designated contained washout areas shall be provided at least 10 meters from any watercourse or surface water drain to minimise the risk of pollution. Washout areas shall be impermeable to prevent pollution of groundwater. Washout areas shall be signposted and delivery drivers informed about their position and washout activities shall be carried out or supervised by competent persons. The *Contractor* shall ensure that washout areas comply with current advice from the EA / SEPA/ NRW .

Hardened concrete, surplus wet concrete and settled silt shall be removed from the wash out area regularly. Liquid silts may require pumping out by a specialist contractor and must be disposed of in accordance with waste legislation.

## **8.15 Refuelling**

The risk of spilling fuel is at its greatest during re-fueling of plant. The *Contractor* shall ensure re-fueling of vehicles and mobile plant shall be carried out in a designated area wherever reasonably practicable. Dedicated re-fueling areas shall have an impermeable base, an adequate oil separator with appropriate discharge consent, and be located away from drains or watercourses.

Where this is not practicable the *Contractor* shall consider, and employ as necessary, the following (list not exhaustive): -

- The provision of drip trays and absorbent mats able to retain 110% of the volume that can spill or be lost from containment,
- Dedicated fuel tanker teams,
- The use of approved containers for hand carrying / delivery of fuels to equipment on site, and
- The provision of proper funnels where hand filling from containers is required.

No re-fueling of mobile plant shall be undertaken within 30 meters of a watercourse or 50 meters of an abstraction borehole without prior agreement of the EA / SEPA. All plant reversing for re-fueling purposes shall be supervised by a banks-man.

All fuel bowzers shall be double skinned and operated by trained and competent personnel. All fuel bowzers shall have adequate spill kits and operational personnel trained in their use.

The *Contractor* shall undertake a risk assessment of the vulnerability of the mobile fuel tankers or bowzers to ascertain if they would be susceptible to impact, hose detachment etc., which would result in the uncontrolled release of the tanks contents. This risk assessment shall include a check on the location and operability of the emergency shut off valve. This assessment shall be recorded and made available on site. Ground conditions, terrain, vehicle type, axle clearance, volume of content carried, content type etc. shall be noted.

The *Contractor* shall ensure that the Works are carried out in accordance with EA / SEPA pollution prevention guidelines and the Control of Pollution (Oil Storage) Regulations 2001.

The *Contractor* shall ensure all road-going Intermediate Bulk Containers (IBC's) and Fuel storage containers including fuel Bowzers are managed in accordance with the latest Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations and the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR regulations). Where ADR regulations do not specifically apply, the *Contractor* shall demonstrate maintenance and inspection

regimes to comply with Provision and Use of Work Equipment Regulations and compliance with manufactures instructions and ensure equipment is suitable for the intended use, safe for use and maintained in a safe condition and inspected to ensure it is correctly installed and managed and does not subsequently deteriorate.

### **8.16 Pollution Prevention**

The *Contractor* shall use guidance from the *Employer* or consenting authorities, such as the Environment Agency and Natural Resources Wales and Scottish Environment Protection Agency, to ensure all measures are taken to avoid pollution.

## 9 CDM

The *Contractor* shall undertake the duties and responsibilities required in accordance with current CDM Regulations and UKBP/TP137.

The *Contractor* shall, where multiple contractors are to be utilised during the Works, be nominated as and undertake the duties and responsibilities of the Principal Contractor in accordance with current CDM Regulations and UKBP/TP137.

The *Contractor* shall, where multiple contractors are to be utilised during the Works, undertake the duties and responsibilities of the Principal Designer in accordance with current CDM Regulations and where referenced as Principal Designer (Design & Build) in Transmission Procedures and in particular UKBP/TP137.

## 10 Quality Management

The Works shall be managed in accordance with a documented Quality Management System (QMS) complying with the specific *Employer* requirements and those of BS EN ISO 9000 series and certified by a United Kingdom Accreditation Service (UKAS) accredited Certification or equivalent Body.

After acceptance by the *Project Manager*, the quality assurance arrangements shall form an integral part of the Works.

Notwithstanding the *Project Manager's* comments on the quality, the *Contractor's* senior management shall demonstrate leadership and commitment with respect to the Quality Management System and shall remain responsible for quality assurance arising from any failure to ensure correct implementation of the QMS.

The *Employer* reserves the right to monitor the implementation and maintenance of the QMS during the Works. Monitoring will be by means of surveillance and/or formal audits of all relevant activities at the appropriate locations. This will include monitoring of subcontractor activities.

On completion of the Works, the *Contractor* shall submit the completed quality plans to the *Project Manager*, as part of the final records.

### 10.1 *Employer's* Requirements

The *Contractor* shall audit their own Quality Management System (QMS) to ensure they meet the required standards. The *Contractor* shall provide the necessary trained auditors, who are independent of the project, to ensure that effectively the QMS is implemented and quality objectives are satisfied.

The *Contractor* shall submit models and samples of materials as required by the *Employer* as specified in Project Specific Works Information.

### 10.2 Quality Plans

The *Contractor* shall provide the following Quality Plans to the *Project Manager* for review and acceptance:

- Contract Quality Plan – provided at Tender Submission,
- Project Quality Plan - The *Contractor* shall provide the *Project Manager* with the first issue of the Project Quality Plan for review and acceptance within twelve (12) weeks of the Contract Date unless agreed otherwise by the *Project Manager*,
- Site Quality Plan - The *Contractor* shall provide the *Project Manager* with the first issue of the Site Quality Plan for review and acceptance six (6) weeks before site establishment unless agreed otherwise by the *Project Manager*,
- Inspection and Test Plans (including supporting Check Sheets, Technical Reports, Technical Records, Etc.) - The *Contractor* shall provide the *Project Manager* with the first issue of the Technical Discipline (i.e. Substation HV, P&C, Civil, OHL, Cables, etc.) Inspection and Test Plan for review and acceptance six (6) weeks before that technical discipline commences on site unless agreed otherwise by the *Project Manager*,



- *Contractor's* Manufacturing Assurance Plan - Dependent on the size and complexity of the Works this can be a separate document or included in the PQP,
- Designer's Quality Plan - Dependent on the size and complexity of the Works this can be included within the PQP or as a separate document, which is provided within twelve (12) weeks of the Contract Date unless agreed other by the *Project Manager*.

Thereafter updates to the Quality Plans shall be submitted to the *Project Manager* for review and acceptance following any amendments and prior to the commencement of any related work in compliance with the timescales as defined above.

All Quality Plans shall be controlled documents carrying a unique reference with revision status and issue date with provision for *Project Manager's* acceptance, signature and date.

The *Contractor* shall remain responsible for quality assurance issues arising from any failure to ensure correct implementation of the quality plans.

### **10.2.1 Contract Quality Plan**

The Contract Quality Plan (CQP) identifies how the *Contractor's* Quality Management System (QMS) demonstrates compliance to the *Employer's* contractual and associated Transmission Specification and Procedural requirements.

The *Contractor* shall develop, implement and maintain a CQP which shall have been presented as part of their tender submission to demonstrate how the *Contractor's* Quality Management System (QMS) is applied to the Works and shall include, as a minimum:

#### **1. Contract Description**

A brief description of the works (including localities if multiple schemes).

#### **2. Quality Policy**

The *Contractor* shall provide a Quality Policy statement.

#### **3. Management Responsibilities (Organogram)**

The organogram shall identify the proposed individuals within the *Contractor's* organisation who have key roles & responsibilities in the contract to ensure that the activities required for the contract are fully planned, implemented, controlled and monitored in accordance with their quality management system.

#### **4. Quality Management System Procedures**

The Contract Quality Plan shall list the *Contractors* QMS procedures which demonstrate compliance to the *Employer's* contractual and associated Transmission Specification and Procedural requirements.

The *Contractor* shall include a Process Based model of their Quality Management System demonstrating the appropriate linkages and how the system will meet the *Employer's* requirements, which shall include the *Contractor's* and the *Employer's* inputs and outputs to the process.

## 5. ISO9001 Certification

The CQP shall include a copy of the *Contractor's* ISO9001 certificate together with the latest quality management review.

### 10.2.2 Project Quality Plan

The *Contractor* shall produce a project specific quality plan (Project Quality Plan) defining the information required to effectively manage project quality with regards to the planning, design, procurement, manufacture, installation and commissioning processes, including all quality requirements imposed on subcontractors and suppliers of plant, materials and services, to demonstrate that the final product meets the *Employer's* requirements. It shall define the *Contractor's* project's quality policies, procedures, criteria for and areas of application, and roles, responsibilities and authorities.

The *Contractor* shall develop the Project Quality Plan and submit to the *Project Manager* for review/acceptance within twelve weeks (12) from the Contract Date, whose acceptance is required to carry out the plan, which shall form an integral part of the Works.

#### 10.2.2.1 Key Elements for the *Contractor's* Project Quality Plan

The *Contractor* shall ensure that the Project Quality Plan contains (as a minimum):

##### 1. Project Description

The *Contractor* shall provide details of the Works, which shall include, but not be limited to:

- A brief description of project in relation to the Contract,
- An overview of the objectives and quality expectations of the Works,
- Identification of constraints that may adversely affect the progress of the Works (e.g. the dependency on third-parties, supplier/subcontractors, untried technology, system constraints, etc.),
- Identification of operational system limitations (e.g. Emergency Return to Service (ERTS)) give a brief statement of which features will be limited, as a result of the constraints identified,
- Any *Contractor's* assumptions shall be identified (e.g. availability of relevant reference documents / information in a timely manner, data from users for test purposes etc.).

##### 2. Programme

As a minimum requirement, an overview of the P6 programme for the project, identifying the P6 programme reference numbers of key stages, such as; planning, design, procurement, manufacturing, construction/site installation, commissioning, etc. This shall include key stages delivered by Others (e.g. third parties, suppliers, subcontractors, etc.) for which the *Contractor* is directly responsible and where applicable the *Employer's* nominated contractors (i.e. Bulk Purchase Equipment Supplier, ETO Operations, etc.)

##### 3. *Contractor's* Quality Policy

The *Contractor* shall provide a copy of their Quality Policy to the *Project Manager* to be displayed at Site.

#### **4. Organisation, Responsibilities, and Interfaces**

The *Contractor* shall describe the key/primary roles and responsibilities of the project staff. They shall also indicate responsibilities for activities such as manufacturing assurance, auditing processes, etc.

The *Contractor* shall provide a Project Team organogram.

#### **5. Project Communications**

The *Contractor* shall identify who has key responsibilities for ensuring that all formal communications, including those with Third Parties, are enacted in accordance with their management systems throughout the Works and define the management process for:

- a) Formal communications with regard to communication management chain and contacts for specific functions (where applicable),
- b) Maintaining formal communication records, and
- c) Complaints or compliments.

#### **6. Subcontractors**

The *Contractor* shall identify the suppliers and/or subcontractors that the *Contractor* intends to use in performing its obligations on the project. This list shall specify the name and address of the supplier and/or subcontractor organisation, the nature of the products or services that it will provide as a part of the Works, the contact person and the start / end dates for the requirement.

#### **7. Quality Management**

The *Contractor* shall describe the levels Quality Management involved during each phase of the Works (e.g. planning, design, procurement, manufacture, site installation and commissioning, etc.)

#### **8. Quality Planning**

The *Contractor* shall identify which quality standards are relevant to the project and how to satisfy them.

The *Contractor* shall identify and define appropriate quality metrics and measures for standards for project processes, including but not limited to: product functionality, regulatory compliance requirements, project deliverables, project management performance, documentation, testing, etc. and identify the acceptance criteria for project deliverables and plant and/or material performance.

##### **8.1 Define Project Quality**

The *Contractor* shall identify quality standards and expectations of the *Employer* with regard to Technical Specifications and Procedural requirements, British and/or International Standards, and applicable legislative requirements,

##### **8.2 Measure Project Quality**

The *Contractor* shall identify the desired metrics and related monitoring processes for which to measure quality standard, develop a plan for measuring quality, define methods of data collection and archiving, and document timeframe for measurement and metrics reporting.

The *Contractor* shall outline acceptance criteria for project deliverables and product performance.

#### **9 Quality Assurance**

The *Contractor* shall define the actions that provide the demonstrable evidence that project quality has been achieved.

## **10 Quality Control**

The *Contractor* shall identify their monitoring and controlling actions that will be conducted to control quality throughout the project's lifecycle.

The *Contractor* shall define how it will be determined that quality standards comply with the defined standards outlined earlier in this document.

## **11 Progress Measurement and Monitoring**

The *Contractor* shall identify the means and the types of information that shall be used to demonstrate the *Contractor's* QMS processes are fully implemented and are in compliance with the *Employer's* requirements.

The *Contractor* shall also identify the risk based sensible quality monitoring requirements (outside that of the Inspection and Test Plans) throughout the Works, dependent on its complexity.

## **12 Requirements of the Supporting Quality Documents**

### **12.1 Designer's Quality Plan**

Dependent on the size and complexity of the Works, the *Contractor* shall prepare, implement and maintain a Designer's Quality Plan (DQP) either within the PQP or provide a separate Designers Quality Plan in accordance with the *Employer's* requirements.

### **12.2 Requirements of the Site Quality Plan and associated Inspection and Test Plan(s)**

#### **12.2.1 Site Quality Plan**

The *Contractor* shall identify the quality assurance, quality control and inspection systems necessary to ensure that the Works are carried out in accordance with the all relevant technical specifications, standards, procedural and contract requirements.

The *Contractor* shall provide programme milestone dates to identify when the prepared Site Quality Plan is ready for initial acceptance by the *Project Manager*.

#### **12.2.2 Inspection and Test Plan(s)**

The *Contractor* shall identify the process for each technical discipline that ensures a fully demonstrable compliance to ensure that the site construction and/or installation works are carried out in accordance with all the relevant technical specifications, standards, procedural and contract requirements, prior to commissioning activities commencing.

## **13 Project Risk Management**

The *Contractor* shall identify the process for the reporting, managing and monitoring of risks identified throughout the Works, with regard to (but not limited to) the following:

- a) Approvals & Consents,
- b) Design and Engineering,
- c) Programme,

- d) Procurement,
- e) Environmental and Archaeological,
- f) Easements,
- g) Construction processes,
- h) Commercial/Contract,
- i) Weather,
- j) Other Interfacing Contractors or Service Providers,
- k) Soil and/or Animal borne diseases, and
- l) Project Specific.

#### **14 Manufacturing Assurance**

Dependent on the size and complexity of the Works the *Contractor* shall identify the process within the PQP or in a separate Manufacturing Assurance Plan to ensure their suppliers can fully demonstrate compliance with the requirements to the *Employer's* relevant specifications, standards and satisfies the quality expectations for that product, prior to leaving their place of manufacture.

The *Contractor* shall define their process for undertaking Manufacturing Assurance Strategy on Plant and/or Materials identified in their design solution in accordance with the requirements identified within UKBP/TP219.

Manufacturing Assurance Plan shall identify how the *Contractor* ensures the correct level of inspections/audits/witness and hold points are required on any manufactured item to ensure the manufactured equipment meets the *Contractor's* and the *Employer's* technical, design and specification requirement; this will be detailed and referenced within the Quality Plan.

Manufacturing Inspection Reporting shall give a detailed log of all inspections/audits/witness and hold points which have been completed by the *Contractor* throughout the Works. The *Contractor* is to ensure that all Manufacturing Inspection Reports are provided as part of the Operations & Maintenance (O&M) documentation in accordance with their Manufacturing Assurance Plan and Programme.

#### **15 Process Controls**

The *Contractor* shall identify the controls which are to be adopted to ensure that the Works are being carried out to Programme in accordance with the resource plan.

As a minimum the *Contractor* shall provide information, with regard to the following:

##### **15.1 Hazard and Design Review Meetings**

The *Contractor* shall identify the frequency of *Contractor's* internal Hazard and Design Review Meetings.

##### **15.2 Approval / Assurance Process**

The *Contractor* shall identify their approval process and the *Employer's* assurance process activities that will be adopted throughout the life of the project.

The *Contractor* shall identify all design audits proposed to be performed during the life-cycle of the Works.

##### **15.3 Change Control**

The *Contractor* shall define the change control management process for changes to the contractual and agreed requirements, including the authorisation level for the approval of changes.

#### 15.4 Monitoring of subcontractors

The *Contractor* shall identify the process for monitoring the effectiveness of subcontractors and/or suppliers.

#### 16. Document Management

The *Contractor* shall identify the control process for the management of documents and records throughout the Works lifecycle.

### 10.2.3 Designer's Quality Plan

The *Contractor* shall prepare, implement and maintain a Designer's Quality Plan (DQP) in accordance with the *Employer's* requirements. It shall clearly identify the design quality management procedures and describe the control processes for design development, approval and assurance of the design output. Specifically, it shall define how the design process will be achieved, controlled, approved, assured, demonstrated and managed.

The *Contractor* shall ensure that the DQP is incorporated within the Contract Quality Plan and implemented.

#### 10.2.3.1 Key Elements for the Designer's Quality Plan

A description of the scope of Works shall be provided by the *Contractor* together with a design brief for the selected design solution for the Works. The Designer's Quality Plan (DQP) shall also provide the definition of the quality assurance methods/techniques that will be required to ensure that the *Employer's* standards are achieved.

The DQP shall identify the main roles, duties and activities with regard to Design Quality Management for the Works, and in addition outlines the lines of communication between the *Contractor's* Design Team and *Contractor's* Project Delivery Team.

Management structures for the Design Team's personnel shall also be included and identify Key Personnel - nominate qualified personnel together with explicit role definition.

The *Contractor* shall identify HOLD and NOTIFICATION points covering all categories as indicated in the *Employer's* procedures, standards and specifications, with particular regard to compliance with UKBP/TP188 – Design Management:

- Design Approval - The *Contractor* shall define the level of responsibility at each stage of the design for design checks and acceptance prior to release to Site.
- Design Assurance – The *Contractor* shall develop and implement a Design Compliance Programme to facilitate the level of design assurance to be undertaken.

The *Contractor* shall be responsible for ensuring that evidence is maintained to demonstrate achieving the quality envisaged, prior to submission for design assurance. Where required to do so, the *Contractor* shall provide the evidence to the *Project Manager*.

The DQP shall define the change control process to ensure that all design changes are referred back to the original designer and that they follow the design approval process.

#### **10.2.4 Site Quality Plan**

The *Contractor* shall develop, implement and maintain the Site Quality Plan (SQP) which provides a site based control document that is linked to the overall Project Quality Plan.

The SQP shall identify such quality assurance, quality control and inspection systems necessary to ensure that the Works are carried out in accordance with the all relevant *Employer's* policy, technical specifications, standards, procedural and contract requirements.

The SQP shall be used as an audit tool and shall identify the HOLD and NOTIFICATION points to be undertaken by the positions accountable within the document.

It shall encompass both permanent and temporary works requirements.

Site installation shall be undertaken by the *Contractor* in accordance with their SQP. Execution of the SQP shall result in an audit trail that displays both adherence to the SQP and evidence of satisfactory quality of workmanship.

The SQP shall identify (as a minimum) the requirements for:

- Providing and maintaining the overall quality of the Works,
- Providing inspection and test plans that specify the stages and extent of the *Contractor's* design, procurement, and inspection and testing of Plant and Materials at the place of manufacture and storage areas, and inspection and testing during the Works it is also to include intervention points by other parties,
- Approving and auditing subcontractor's Quality Plans, and
- Responsibilities for submitting and receiving HOLD and NOTIFICATION points and management of any other procedural events.

The *Contractor* shall review SQP in accordance with their QMS and/or following completion of any major project phase/stage of the Works and/or changes in the Site Management roles.

The SQP shall identify the requirements for all Inspection and Test Plan required during the construction/installation phase of the Works.

The *Contractor* shall ensure that the Site Quality Plan contains (as a minimum):

##### **1. Project Description**

The *Contractor* shall provide a description of construction / site installation activities in relation to the Works.

##### **2. Programme**



The *Contractor* shall provide details on how they intend to establish progress against programme.

### **3. Site Roles, Responsibilities, Competencies and Authorities**

The *Contractor* shall identify key site based personnel assigned to the Works, together with their roles, responsibilities, competencies and their level of authorities.

(Note: In doing so, the *Contractor* confirms that the key site personnel assigned have the competencies, experience and knowledge in fulfilling the quality requirements of this Contract).

Including a competency matrix

The *Contractor* shall identify key suppliers/subcontractors assigned to this project, together with their roles, responsibilities, competencies and authorities.

### **4. Site Specific Procedures and Work Instruction**

The *Contractor* shall identify all site specific procedures and associated work instructions to be adopted throughout the site construction / installation phase of the Contract.

### **5. Management of suppliers/subcontractors Site Quality Plans (SQPs)**

The *Contractor* shall identify their management process for all key supplier/subcontractor and that they have fully developed SQPs, which identifies all work to be undertaken, prior to work/task activities commencing at Site.

### **6. Inspection and Test Plan(s) (ITP(s))**

The *Contractor* shall identify the Inspection and Test Plan(s) for each technical discipline required during the site construction / installation phase (i.e. Substation HV, P&C, Civil, OHL, HV Cables, etc.) and confirmation that they are prepared and accepted for all plant and materials prior to that technical discipline commencing construction / installation work activities at Site.

### **7. Site Communications**

The *Contractor* shall identify the management process for site communications (such as, site emergency arrangements, incident reporting, etc.) and those responsible for implementation throughout the Works, with regard to:

- a) Site communication and contact points for specific functions (i.e. team briefs, safety bulletins, daily point of work brief, etc.),
- b) Maintaining site communication records, and
- c) Site complaints or compliments

### **8. Local Purchasing**

The *Contractor* shall identify the management process for ensuring that all local site purchased products do not affect the quality standards of the Works, with regard to:



- a) How the quality standards are to be communicated to suppliers, to enable quality control throughout the product or service life cycle,
- b) The methods to be used to evaluate, select and control external suppliers,
- c) Requirements for, and reference to, supplier quality plans or other plans, where appropriate,
- d) The methods to be used to satisfy the relevant quality assurance requirements, including statutory and regulatory requirements that apply to purchased products,
- e) Verification purchased product conformity to specified requirements, and
- f) Control of Receipt of Goods and preservation of product.

## **9. Site Risk Management**

The *Contractor* shall identify the process for the reporting, managing and monitoring of Site installation risks with regard to (but not limited to) the following:

- a) Construction – Ground Conditions,
- b) Construction – Materials and Machines,
- c) Construction – Programme,
- d) Construction – Resources,
- e) Construction – Resources,
- f) Weather, and
- g) Site Installation Specific.

## **10. Site Records (Site filing)**

The *Contractor* shall identify their management process for retaining all site records throughout the site establishment/ installation/commissioning/demobilisation stages. Including an indexed site filing system.

## **11. Change Control (Key personnel & process)**

The *Contractor* shall identify their change control management process for key personnel and process changes throughout the site establishment/ installation/commissioning/demobilisation stages.

## **12. Audits**

The *Contractor* shall identify their risk based audit management process for undertaking audits during site installation on them and their subcontractors and include a site audit schedule.

## **13. Quality Sensible Monitoring**

The *Contractor* shall identify their audit management process for undertaking sensible monitoring during site installation on them and their subcontractors. Planning of the sensible monitoring system should take into account those risks captured in the Hazard Register in accordance with TP188.

**14. Defects Register**

The *Contractor* shall identify their management process for ensuring that all defects raised at Site are actioned and formally closed out within agreed timescales.

**15. Non Conformances**

The *Contractor* shall identify their management process for ensuring that all non-conformances raised at Site are actioned and formally closed out within agreed timescales.

**16. Permanent & Temporary works**

The *Contractor* shall identify their management process for permanent & temporary works throughout the site establishment/ installation/commissioning/demobilisation stages.

**17. Sign off by Contractor**

The *Contractor* shall be responsible for validating each revision of the Site Quality Plan throughout the site establishment/ installation/commissioning/demobilisation stages.

**10.2.5 Site Inspection and Test Plans**

The *Contractor* shall ensure that an Inspection and Test Plan for each discipline (Civil, P&C, Substation HV, Cable, OHL etc.) which shall include reference to performance standards, acceptance criteria, and the certification/records is generated.

Inspection and Test Plans shall be prepared for all Plant and Materials, the *Contractor's* main installation work activities and subcontracted activities, with reference to the SQP.

Inspection and Test Plans shall identify the specific arrangements required to control the quality of the final product and verify it meets the standards and specifications intended by the *Employer*.

The Inspection and Test Plans shall include 'HOLD' and 'NOTIFICATION' points and identify supporting document/check sheets required for completion prior to progression of installation.

The *Contractor* shall confirm that all inspections and tests on Plant and Materials as part of the Works (or phase of the Works) have been fully completed, as detailed in the Inspection and Test Plan, prior to that Plant, Equipment and Materials being handed over for Commissioning.

The *Contractor* shall be responsible for the development, implementation and maintenance of inspection check sheets, reports and records to provide an auditable trail to demonstrate evidence in supporting the ITP(s) compliance with the requirements of the *Employer's* Technical Specifications, Standards, Manufacturer's Installation Instructions/Manuals, etc. throughout the site installation of plant and materials and/or work/task activities identified in the ITP(s).

The *Contractor* shall take note that Inspection and Test Plans that rely on singular references to Site Commissioning Test (SCT) Sheet shall not be acceptable.

SCTs that are referenced in the Inspection and Test Plans shall encompass all relevant inspections and testing requirements for commissioning purposes only.

The ITP and associated check sheets shall identify the key elements (as a minimum) for:

- a) Process and product monitoring and measurement to be applied,
- b) The stages at which they should be applied,
- c) The quality characteristics to be monitored and measured at each stage,
- d) The procedures and acceptance criteria to be used,
- e) Any statistical process control procedures to be applied,
- f) Where inspection or tests are required to be witnessed,
- g) Product verification and product validation,
- h) Installation and test equipment calibration records,
- i) The criteria for product release, and
- j) Documental evidence to support site installation activities throughout the construction/site installation phase.

#### **10.2.5.1 Check Sheets, Technical Reports, Technical Records etc.**

The *Contractor* shall be responsible for compiling, implementing and maintaining documental evidence to support their Inspection and Test Plan(s), these may be in the form of check sheets, technical reports, technical records, test sheets, inspection sheets, etc.

This information will be provided (electronically) before Completion so as to enable the *Employer* to trace the total history of all approvals, inspections, audits made during design, manufacture and installation activities.

The *Contractor* shall provide evidence to support site installation activities throughout the construction/site installation phase.

The *Contractor* shall be responsible for:

- a) Providing Check Sheets, to formally confirm that all activities identified within the Inspection and Test Plan(s) have been successfully completed in accordance with the relevant Standards and Technical Specifications and/or Manufacturer's Installation Instructions,
- b) Ensuring that the check sheet(s) is maintained and updated throughout the activity by the operative, and
- c) Confirming that the check sheet(s) have been verified as completed by the *Supervisor*.

The Inspection Check Sheet shall identify the following (not exhaustive):

- a) Contractor,
- b) Scheme Number /Scheme Title,
- c) Site/Location,
- d) Equipment/Plant Item,
- e) Inspection and Test Plan Reference,
- f) Activity Undertaken by
  - *Contractor's* Name,
  - Individual(s),
- g) Drawing Number(s) relevant to the installation activity,
- h) Specialist Tool(s) (where required), including, where applicable:
  - Serial Number,
  - Calibration Date; and that it is,
  - Maintained in a serviceable condition.

- i) Confirmation by operative and verification by *Supervisor* that the activity has been in accordance with the relevant Standards and Technical Specifications and/or Manufacturer's Installation Instructions,
- j) Confirmation of inspection check sheet(s) receipt and acceptance by the *Contractor*.

### **10.2.6 Subcontractor/Supplier Quality Plans**

The *Contractor* shall be responsible for ensuring that the *Contractor's* subcontractors/suppliers prepare, implement and maintain a subcontractor/supplier Quality Plan and associated Inspection and Test Plan(s) for purchased Plant and Materials, main works activities and subcontracted activities.

The *Contractor*, and any subcontractors, shall be expected to have accreditation to ISO: 9001, unless agreed otherwise by the *Project Manager*. Where the subcontractor has no ISO 9001 accreditation then the *Contractor* shall embed the subcontractor's SQP and ITP(s) with the *Contractor's* SQP and relevant discipline ITP(s).

In addition, the *Supervisor* retains the right to inspect all Plant and Materials, processes and documentation as well as witness any Factory/Type Testing that may be carried out.

### **10.2.7 Contractor's Manufacturing Assurance**

Manufacturing Assurance required to be undertaken by the *Contractor* to ensure that throughout the manufacturing process the manufacturer's quality systems demonstrate compliance with the requirements to National Grid policy, relevant specifications, standards and satisfies the quality expectations for that product, prior to leaving their place of manufacture.

The *Contractor* shall be responsible for developing, implementing and maintaining a Manufacturing Quality Assurance Strategy for the manufacturing works ensuring that their manufacture/supplier develops and implements a complete quality assurance process. A copy of the initial and any subsequent revision of Manufacturing Quality Assurance Strategy to be provided to the *Project Manager* as per timescales or as agreed by the *Project Manager*.

This process shall also identify the quality requirements imposed by the manufacture/supplier on their subcontractors and suppliers of materials and services.

Manufacturing Assurance may be undertaken by the *Employer*, on items provided by the *Contractor* and/or that of their subcontractors/suppliers/manufacturers to validate the subcontractor/supplier/manufacture Quality Management Systems with regard to the inspection, testing and confirmation of compliance throughout the Plant and Materials manufacture.

The *Contractor* shall provide the *Project Manager* with their Manufacturing Assurance Plan/Programme developed from their Manufacturing Quality Assurance Strategy and assist the *Project Manager* to implement a manufacturing assurance audit strategy on behalf of the *Employer*.

A copy of the initial and any subsequent revision of Manufacturing Quality Assurance Plan/Programme shall be provided to the *Project Manager* as per timescales or as agreed by the *Project Manager*.

This shall not remove the *Contractor's* responsibilities regarding their Manufacturing Assurance.

#### **10.2.7.1 Manufacturing Quality Assurance Inspection Reports**

The *Contractor* shall provide the *Project Manager* with copies of all Manufacturing Quality Assurance Inspection Reports of Manufacturing Assurance inspections undertaken on their Manufacturer/Supplier in accordance with their Manufacturing Assurance Strategy, as part of the Operation and Maintenance documentation.

#### **10.2.7.2 Manufacturer/Supplier's Certificate of Conformity**

The *Contractor* shall be responsible for ensuring that a Manufacturer/Supplier Certificate of Conformity is provided for all manufactured products as part of the delivery documentation, signed by the supplier's nominated quality representative, confirming, at the time of assessment, the product met the *Employer's* specific requirements.

Manufactured products that are not accompanied by Certificates of Conformity shall be deemed not to have been delivered.

The *Contractor* shall provide copies of all Certificates of Conformity to the *Project Manager*.

The *Contractor* shall provide update information regarding their Manufacturing Quality Assurance Non-Conformity Register as part of the monthly Contract Status Report.

#### **10.2.7.3 Project Manager's Manufacturing Quality Assurance Audits**

The *Project Manager* is responsible for undertaking Manufacturing Assurance Audits on the *Contractor* and/or their manufacturer/supplier.

The *Contractor* shall ensure that the *Project Manager's* manufacturing assurance activities are provided to their subcontractor and/or manufacturer/supplier for inclusion within their Quality Assurance Plan, Inspection Plans and associated Programmes.

The *Contractor* shall provide all manufacturing assurance activity information on a monthly basis within the Contract Status Report to the *Project Manager* prior to the Monthly Project Meeting.

### **10.3 Quality Audits**

The *Contractor's* proposed internal and external audit programme shall be submitted to the *Project Manager* for review, in compliance with the timescales. The *Contractor* shall update the audit programme each month to show the status audits and changes to the programme.

The *Contractor* will be advised of those audits the *Employer* wishes to observe.

A copy of all internal and external audit reports shall be formally issued to the *Project Manager* for review.

The *Employer* and/or the *Project Manager* will conduct site audits as required by the *Employer's* quality system to ensure activities are being carried out in accordance with Contract Standards and Specifications.

The following areas may be audited, though this list is not exhaustive:

- Corporate audits e.g. ISO9001,
- Compliance Audits,
- Quality Management System Audits,
- Technical Audits,
- Manufacturing Audits, and
- Site Installation Quality Sensible Monitoring.

The *Employer* shall have visibility of corrective and preventive measures identified and implemented as a result of internal/external audits, relating to the *Employer's* project.

## **10.4 Inspection by the *Employer***

The *Employer* reserves the right to inspect any and all of the Works as and when necessary.

Notification of readiness for inspection of manufactured Plant and Materials shall be given to the *Employer*, a minimum of fifteen (15) working days prior to the Test/Inspection activity. The *Contractor* is responsible for ensuring that the *Employer's* witness inspection requirements are advised to their subcontractors/suppliers and that reasonable access to the subcontractors/suppliers facilities is provided in a timely manner.

During the course of the Works, the *Project Manager* may monitor the implementation of the quality assurance arrangements. Monitoring will be by means of surveillance of activities at work locations and/or formal audits of the adherence by the *Contractor* to quality assurance arrangements.

The *Project Manager* reserves the right to participate, on an agreed basis, in the *Contractor's* monitoring of subcontractors' quality assurance arrangements.

The *Contractor* will be notified of the results of witnessing, inspection and actions in accordance with the Project & Site Quality Plans and the *Employer's* quality system documentation.

## **10.5 Inspection by the *Contractor***

Inspection shall be undertaken in accordance with the *Contractor's* Inspection and Test Plans (ITPs) and Manufacture Assurance inspections.

## **10.6 Quality Documentation**

The *Contractor* shall provide all Quality Documentation to the *Project Manager* for their retention. Information shall be provided before Completion to enable the *Employer* to trace the total history of all approvals, inspections, audits made during design, procurement, shipping, manufacture, installation and commissioning activities in accordance with Section 7.11.6 – Project Handover Records.

## **10.7 Site defects and Non-Conformance during the Works**

### **10.7.1 Defects**

The *Contractor* shall be responsible for the implementation and maintenance of the *Employer's* Electronic Defect Register, all defects (including those deemed as “snags”) as they arise.

### **Electronic Defect Register Template**

The *Contractor* shall be responsible for requesting the electronic defect register template from the *Project Manager*, a minimum of six (6) weeks before site establishment.

### **Monthly Reporting of the Defect Register**

The *Contractor* shall be responsible for providing the *Project Manager* with a copy of the Defect Register on a monthly basis.

### **Employer's nominated contractors**

The *Contractor* shall be responsible for ensuring that defects generated by Others, working within the *Contractor's* Working Area(s) (i.e. Bulk Purchase Equipment Supplier, ETO Operations, etc.) are provided by Others and listed within the Defects Register.

The *Contractor* shall be responsible for ensuring that all defect actions are closed out within agreed timescales.

**Note:** - It remains the responsibility of the *Employer's* nominated contractor to close out their actions within the agreed timescales for all their defects.

## **10.7.2 Non-Conformance Reporting**

All non-conformances shall be reported immediately to the *Project Manager* upon finding.

The *Contractor* shall be responsible for ensuring that all non-conformance actions, action owner and timescales for closure have been accepted by the *Project Manager*.

The *Contractor* shall be responsible for the recording and the management of all non-conformances found in accordance with their Quality Management Systems (QMS), which shall include as a minimum:

- Description of non-conformance,
- Date of non-conformance found,
- Agreed action to rectify non-conformance,
- Preventive Action,
- Action Owner,
- Timescales for close-out,
- Signature confirmation for closure of action, and
- Date confirming of action close out.

The *Contractor* shall ensure that they, their subcontractors and Others rectify any non-conformances within the timescales agreed by the auditor and the *Project Manager*.

The *Contractor* shall ensure that all non-conformances on Plant and Materials, whenever practicable, shall be closed-out prior to release for commissioning to demonstrate compliance.



## 11 Commissioning

### 11.1 Tests and Inspections

All Commissioning and Decommissioning test and inspection activities shall be carried out in accordance with the *Contractor's* own procedures and in conjunction with the *Employer's* Transmission Procedure UKBP/TP106 and undertaken by those authorised to UKBP/TP141.

Prior to commissioning activities commencing, the *Contractor* shall be responsible for confirming that all site installation inspections and tests identified in the Inspection and Test Plan (for the equipment to be commissioned) have been signed off as completed.

The *Contractor* shall demonstrate that the Plant and Materials supplied meet the specified performance requirements set out in the Contract and the *Employer's* Technical Specifications, both before the Plant and Materials leaves their place of manufacture/assembly and again in support of pre-commissioning procedures as appropriate once the Plant and Materials have been erected as part of the Works at Site.

Factory Acceptance Tests (FATs) deemed satisfactory by the *Employer's* Commissioning Officer will not be required to be repeated on Site. However, Plant and Materials on Site shall be tested to the appropriate Site Commissioning Tests (SCT) Schedules. Documented evidence shall be provided for all FATs and Site Acceptance Tests (SATs) prior to final commissioning.

The *Contractor* shall produce, in a form and to the timescales agreed by the *Project Manager*, all test schedules and programmes, and all necessary documentation for the recording and presentation of results.

The *Contractor* shall provide a list of any Special Tools and/or Test Equipment required to operate, maintain and repair the equipment, installed as part of the Works to the *Project Manager* following Design Intent Document (DID) Freeze. This list shall be reviewed by the Commissioning Panel for acceptance.

The Plant and Materials shall be subject to Commissioning Tests and Inspections as detailed in the Site Commissioning Test Schedules (SCT) where applicable. These SCT's have specific forms that need to be completed as appropriate to the system design and accepted by the *Employer's* Commissioning Engineer.

The required tests and inspections are normally carried out as Stage 1 commissioning tests prior to the system being energised on the National Grid Transmission System.

Where required, inspections shall be carried out prior to being covered up or reinstated.

#### 11.1.1 Commissioning Programme

The Commissioning Programme in UKBP/TP106 makes reference to three inspections. The pre-commissioning inspection has an optional format whilst the pre-energisation and post-commissioning inspections have model formats specified within UKBP/TP106. Responsibility for preparing the inspection requirements is with the *Contractor*, unless otherwise specified by the Commissioning Panel. Execution of the inspection will usually be jointly carried out by either party, as determined by



the CPC. The degree to which the *Contractor* is required to participate in the method of connecting equipment to the existing transmission system and the subsequent energisation and on-load tests shall be specified by the CPC.

### **11.1.2 Commissioning Risk Assessment and Method Statements**

Commissioning Risk Assessments and Method Statements shall accompany all activities defined as containing inherent risks. Work on busbar protection equipment, both old and new, shall be subject to Method Statements defined as Stage 2 Method Statements. The *Contractor* shall be responsible for the production of these documents for each and every activity that is considered by the Commissioning Panel to have a potential effect on the existing system and/or its connectees. The *Employer* will advise on the format and agree the structure with the *Contractor*. The *Employer's* commissioning representative and the *Contractor's* commissioning engineer shall implement the agreed procedures on site. Drawing anomalies, ambiguities and clarifications are to be referred to the *Employer* by the *Contractor*.

### **11.1.3 Acceptance Testing Requirements**

The *Contractor* shall be responsible for undertaking Plant and Material testing using acceptable and tested solutions with regard to their own procedures and quality management systems.

The *Contractor* shall produce a detailed description of the test procedures to be used during site tests, identified within the commissioning programme, detailing dates and durations of all elements of the site testing.

Comprehensive testing and commissioning is required which will encompass testing of the Substation Control System hardware, software, configuration and plant interface connections to confirm the overall integrity of the Works.

Where Plant and Materials or software is not currently Type Registered, the *Contractor* is required to carry out tests and achieve Type Registration, prior to Site Acceptance Tests. These activities and the test platform to be used shall be separately described in the Quality Assurance Plan.

All testing will be subject to the *Employer's* standard safety procedures and all operational switching will be carried out by the *Employer*, according to a detailed programme which shall be agreed in advance with the *Contractor*.

### **11.1.4 Acceptance Testing Resources**

The *Contractor* shall ensure that sufficient and competent resources are available during the testing and commissioning phases at each circuit end.

No commissioning resources will be made available, by the *Employer*, to carry out activities required during testing and commissioning, other than that of witnessing the actions of others and confirming results.

Initial energisation and all subsequent “live” tests, through to and including being “Available for Commercial Load” of every circuit, will be directed by the *Employer* and carried out jointly with the *Contractor*.

### **11.1.5 Commissioning File**

The *Contractor* shall produce a Commissioning File for discussion as part of the Commissioning Panel process following the inaugural commissioning panel meeting, in accordance with the requirements of UKBP/TP106.

## 11.2 Management of Tests and Inspections

The *Contractor* can accompany the *Project Manager* when inspections take place should they so wish.

The *Contractor* shall be responsible for the inspection and testing of all 'Civil, Structural & Building Engineering' works necessary to confirm or demonstrate their compliance with the applicable specification. The *Contractor* shall prepare and implement Inspection and Test Plans in accordance with NGTS 3.10. Refer to Design Handbook 10 (DH10) for further details.

In addition all components of an oil containment scheme shall be verified and agreed in accordance with the Civil Commissioning Test Schedules (CCTS) available on the *Employer's* Extranet. These shall be taken as specimen documents and shall be modified as necessary to incorporate changes to proprietary products and/or specific design applications. Where the *Contractor* has received approval to use a product not included in the CCTS list they shall develop an appropriate schedule for that product. All CCTS shall be produced in conjunction with the product manufacturer where appropriate and be submitted to the *Employer* for acceptance prior to any associated commissioning.

The *Contractor* shall ensure for each major element of the Works, the *Supervisor's* hold and witness Points for inspections and tests are included in the Method Statement and Risk Assessment.

## 11.3 Covering up Completed Work

All completed work that has been tested, inspected, witnessed and confirmed by the relevant parties to be fully acceptable shall be reinstated immediately without delay to prevent any later damage or interference. Any such work which for any reason cannot be reinstated shall be subject to the *Contractor* site security and surveillance until reinstated.

The *Contractor* shall ensure for each major element of the Works, the *Supervisor's* hold and witness Points for inspections and tests are included in the Method Statement and Risk Assessment.

## 11.4 Type Registration

The *Employer* operates a Type Registration system for Plant and Materials to be connected to its system, the purpose of which is to ensure compliance with the *Employer's* technical standards and specifications and to demonstrate the strength and capability of the Plant and Materials offered.

The *Contractor* shall comply with the *Employer's* Type Registration process (UKBP/TP183) and related Technical Guidance Notes (TGN). It is the *Contractor's* responsibility to ensure that any subcontractors are supplied with, and fully aware of, the relevant requirements of these Standards in enquiries to, and orders placed with, subcontractors.

The *Contractor* shall be responsible for ensuring that their Type Registered Equipment Declaration Schedule has been completed as part of their Tender Return in accordance with the requirements defined in UKBP/TP188.

The *Contractor* shall be responsible for identifying the type(s) of primary and secondary Plant and Materials to be offered and in ensuring that the Type Registration status (EGI code/reference), together with a list of nominated Plant and Materials suppliers are listed in the project Design Intent Document (DID), in accordance with the requirements defined in UKBP/TP188..

The *Contractor* shall be responsible for identifying all proposed Plant and Materials that are not already Type Registered; these shall be accompanied with a detailed programme to achieve Type Registration for acceptance by the *Project Manager*, in accordance with the requirements defined in UKBP/TP183.

**Note:**

No Equipment shall be commissioned unless it has been issued with a distinct EGI code. The same process shall apply to Equipment not required to undergo the Type Registration process i.e. approved for use.

Where these criteria cannot be achieved, the *Contractor* shall obtain a formal derogation as per the requirements described in UKBP/TP183.

The *Contractor* shall declare that all Plant and Materials offered are both Type Registered and fully compliant with the *Employer's* technical requirements and other referenced National and International standards.

Where non Type Registered Plant and Materials is offered, the *Contractor* shall provide a Programme to obtain Type Registration status during the Works and include a nominated date for provision of stated alternative Plant and Materials should the Programme be compromised. The nominated date for provision of the alternative Plant and Materials shall not jeopardise the commissioning date agreed for that section of the Works. If the originally intended Plant and Materials does not achieve Type Registration by the date required the *Contractor* will provide an alternative and the originally intended Plant and Materials shall be removed and suitably Type Registered Plant and Materials shall be installed at the *Contractor's* cost and time.

The removal of existing Plant and Materials from the system for replacement shall not be permitted without full confirmation of Type Registration for the new Plant and Materials, or an agreed derogation from the *Employer*.

The *Employer* reserves the right to witness any or all tests associated with Type Registration. The *Contractor* shall provide at least four (4) weeks' notice of any tests to be carried out.

## **12 Other Requirements**

### **12.1 Software Provision**

The *Contractor* shall be responsible for the provision of all new technology software, implemented in their design solution, as required by the Technical Specifications and agreed within the Commissioning Panel Meeting Minutes.

### **12.2 Accounts and Records**

The *Contractor* is required to comply with the financial records and account procedures issued by the Financial reporting Council.

## 13 Completion

### 13.1 Introduction

#### Final Clean

The *Contractor* shall make full provision for final reinstatement of all Works after the construction works is complete. This shall include, but not be limited to:

- Removal of all construction Equipment, unused Plant and Materials, temporary works site establishment including temporary services,
- Reinstatement of Highways access points unless required by the final design,
- Reinstatement of Cable/Overhead Line route to agreed final condition with grantors,
- Provision of any required landscaping determined in the planning requirements,
- Reinstatement of any hedgerows, stock fences/gates etc. removed during construction,
- Cleaning of local highways, private roads or access tracks used during the Works, and
- Photographic Records.

### 13.2 Pre-completion arrangements

The *Employer* operates a formal commissioning process for Plant and Materials to be added to the Transmission System. This process is detailed within UKBP/TP106 and the *Contractor* shall make provisions for the appropriate staff and equipment to assist in this process.

### 13.3 Take Over

#### 13.3.1 Technical Completion Statement

Prior to hand-over, the *Contractor* shall submit to the *Employer* a technical completion statement clearly stating that the Works have been designed and constructed to meet the functional performance characteristics specified for the required design life.

#### 13.3.2 Completion Certificate

The *Contractor* shall formally submit (via Conject) an application for handover of partial or full Works completion, following acceptance of the *Contractor's* technical completion statement to the *Project Manager*.

## Appendices

Appendix:	Document Title:	Completed / Provided by:
A	Consultation Schedule (template)	<i>Contractor</i> (Example template provided)
B.1	Health and Wellbeing Policy	<i>Employer</i>
B.2	<i>Employer</i> Environmental Policy Statement	<i>Employer</i>
C.1	National Grid Good Practice Guidance Handbook /	<i>Employer</i>
C.2	National Grid Expected Practice Guidance Handbook	<i>Employer</i>
C.3	Sustainability Good Practice Handbook	<i>Employer</i>
C.4	SHES Alerts and Bad Practice	<i>Employer</i>
C.5	Good Practice Submission Process	<i>Contractor</i> (Template Provided)
C.6	Implementation of and Existing Good Practice	<i>Contractor</i> (Template provided)
D	Electricity Tx Banned Items Poster	<i>Employer</i>
E	Environmental Aspects and Impact register (template)	<i>Contractor</i> – (Example Template Provided)
F	National Grid – Our Contribution	<i>Employer</i>
G	Sustainable construction implementation plan	<i>Employer</i>
H	Sustainable use of aggregates (template)	<i>Contractor</i> (Template Provided)
I	Spoil use decision tree	<i>Employer</i>
J	Sustainability Opportunities Assessment Tool Register	<i>Contractor</i> (Template)
K	Carbon Interface Tool (template)	<i>Contractor</i> (Template Provided)
L	Permit to pump (template)	<i>Contractor</i> (Example Template Provided)
M	Water Management Plan (template)	<i>Contractor</i> (Example Template Provided)
One	Standards and Specifications	<i>Employer</i>

## Amendment Record

Issue	Date	Summary of changes/ reasons	Author(s)	Authorised by	Approved by
1	01/09/17	First issue	Multiple	Jocelyn Hunt Commercial Officer	Steve Coxon Commercial Manager