Heat Network Technical Assurance Scheme

Existing Heat Networks

Technical Specification

District Distribution Network

Milestone 2

HNTAS-EX-TS-DD-M2

Version History

Revision	Notes	Date
V0.1	Draft issue	17/12/25

Disclaimer

The following HNTAS Code document is published in draft format. This document is intended to give the sector early sight of HNTAS requirements in their current stage of development for the purpose of facilitating sector understanding of the scheme.

Draft Code documents, including Technical Specifications and Assessment Procedures, have been reviewed and consulted on through a series of technical workshops with participation from a range of experts from across the heat network industry. The content of this document is still in development and subject to change. Requirements should not be considered as fixed at this stage.

Changes which may be made to this document in future include those to:

- reflect learnings from the New Build and Existing network pilot programmes;
- align with aspects of HNTAS which are subject to public policy consultation;
- align with new requirements in TS1 and MMS;
- align the terminology of this document with that used in other HNTAS documentation;
- rectify errors in this draft version; and
- improve clarity of contents.

The Key Failures set out in the draft Code documents have been identified as a specific area for review, to ensure that:

- all Key Failures enable a binary assessment;
- Key Failures are only included for genuine issues presenting major risks to KPIs, and that moderate or lower risks are considered via non-conformity processes; and
- Key Failures do not duplicate Technical Requirements unless there is a clear justification to do so.

DESNZ will be welcoming feedback on the information in this document via a change management process. This process will run in parallel to the HNTAS policy consultation and DESNZ invites stakeholders to engage with both, once they are open. You can sign up to receive updates on future detailed draft technical documents as they are published by contacting: heatnetworks@energysecurity.gov.uk.

Please be advised that this document references other HNTAS draft Code documents which have not yet been published. References to other documents will also be subject to change following the publication of updated standards. The final version of this document will be released before the launch of HNTAS.

Contents

Foreword

This Technical Specification forms part of the UK Government's Heat Network Technical Assurance Scheme (HNTAS, The Scheme) delivered by the Department for Energy Security and Net Zero, in partnership with the Scottish Government and Ofgem. The Department for Energy Security and Net Zero appointed FairHeat as technical author for this document.

The Scheme has been designed and developed in consultation with a range of experts across the heat network industry in the form of Technical Sub-Working Groups, culminating in a series of Technical Specifications and Assessment Procedures to facilitate the validation and verification of performance outcomes of Elements within a Heat Network.

This document specifies HNTAS Requirements for a District Distribution Network Element within an Existing Heat Network required at Milestone 2.

This document sits within a series of Technical Specifications for a District Distribution Network, which features within a wider Code documentation structure, as outlined in Table 1.

This Technical Specification has been issued in draft format and will be updated prior to scheme launch.

For further information on the use of this document within the Heat Network Technical Assurance Scheme, please refer to:

- the Heat Network Technical Assurance Scheme – Existing Heat Networks – Scheme Rules – Assessment Regime (HNTAS-EX-SR-XX-AS) document;
- the Heat Network Technical Assurance Scheme – Ongoing Regime – Scheme Rules – Replacement Regime (HNTAS-ON-SR-XX-RR) document.

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Shadow Code Management Committee

During the development of HNTAS, a Shadow Code Management Committee has been established, with representation from the Department for Energy Security & Net Zero (DESNZ), the Scottish Government, Ofgem and Heat Trust. The following items have been presented to, and approved by, this committee:

- Structure of Code documents for Existing Heat Networks
- Approach to Technical, Performance Monitoring and Data Protection and Smart Metering Requirements at each Milestone
- KPIs and thresholds at each Milestone

Code Document Structure

Technical Specifications

Document Type	Element		Milestone					
			Overview	Milestone 2	Milestone 3A	Milestone 3B	Milestone 4	Milestone 5
			M0	M2	M3A	M3B	M4	
Technical Specification	Energy Centre	EC	HNTAS-EX-TS-XX-M0	HNTAS-EX-TS-EC-M2	HNTAS-EX-TS-XX-M3A	N/A	HNTAS-EX-TS-EC-M4	HNTAS-NB-TS-EC-P4
	District Distribution Network	DD		HNTAS-EX-TS-DD-M2		N/A	HNTAS-EX-TS-DD-M4	HNTAS-NB-TS-DD-P4
	Substation	SS		HNTAS-EX-TS-SS-M2		N/A	HNTAS-EX-TS-SS-M4	HNTAS-NB-TS-SS-P4
	Communal Distribution Network	CD		HNTAS-EX-TS-CD-M2		N/A	HNTAS-EX-TS-CD-M4	HNTAS-NB-TS-CD-P4
	Consumer Connection	CC		HNTAS-EX-TS-CC-M2		HNTAS-EX-TS-CC-M3B	HNTAS-EX-TS-CC-M4	HNTAS-NB-TS-CC-P4

Table 1: Existing Network Technical Specification structure

Scope

This document specifies the HNTAS Requirements for a District Distribution Network within an Existing Heat Network at Milestone 2.

Ongoing conformity with the requirements in this Code document shall also be maintained following the Milestone 2 assessment until conformity with Milestone 4 is demonstrated.

A District Distribution Network is defined as any pipework system that is not within a building and distributes thermal energy from one location within a Heat Network to another. For example, distributing thermal energy from an Energy Centre to a Building Connection underground.

A detailed definition of the District Distribution Network is contained within the Heat Network Technical Assurance Scheme – Existing Heat Networks – Technical Specification – Overview (HNTAS-EX-TS-XX-M0) document.

References

Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- Heat Network Technical Standard (TS1) (HNTAS, 2025)
- Heat Network Metering and Monitoring Standard (MMS) (HNTAS, 2025)
- Heat Network Technical Assurance Scheme – Existing Heat Networks – Scheme Rules – Assessment Regime (HNTAS-EX-SR-XX-AS)
- Heat Network Technical Assurance Scheme – Ongoing Regime – Scheme Rules – Replacement Regime (HNTAS-ON-SR-XX-RR)
- Heat Network Technical Assurance Scheme – Existing Heat Networks – Technical Specification – Overview (HNTAS-EX-TS-XX-M0)

Informative references

There are no informative references in this document.

Terms and Definitions

For the purposes of this document, the terms and definitions given in the Heat Network Technical Assurance Scheme – Terms and Definitions (HNTAS-XX-TD) document apply.

M2. Requirements for Milestone 2

M2.1. Technical Requirements

The applicable HNTAS Technical Requirements in Table 2 shall be fulfilled.

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M2.1.1.	The O&M Manual shall be maintained in accordance with the applicable technical standard(s).	TS1 7.17.3 TS1 7.17.6	DD-M2-E01 DD-M2-E04
M2.1.2.	The Planned Preventative Maintenance (PPM) Schedule shall be in accordance with the applicable technical standard(s).	TS1 7.6.5 TS1 7.14.4 TS1 7.15.2 TS1 7.15.3 TS1 7.15.4 TS1 7.15.5 TS1 7.15.10 TS1 7.15.13 TS1 7.17.2	DD-M2-E02
M2.1.3.	All documentation and drawings shall be up-to-date in accordance with the applicable technical standard(s).	TS1 7.12.2 TS1 7.17.6 TS1 7.17.8 MMS 4.1.2	DD-M2-E01 DD-M2-E04 DD-M2-E11 DD-M2-E12
M2.1.4.	All documentation and drawings shall be stored in a manner that facilitates easy access to organisations responsible for carrying out operation and maintenance activities in accordance with the applicable technical standard(s).	TS1 7.15.16 TS1 7.17.9	DD-M2-E10
M2.1.5.	The District Distribution Network shall be maintained in accordance with: • the O&M Manual(s); • the PPM Schedule; • any manufacturers requirements; and • the applicable technical standard(s).	TS1 7.6.1 TS1 7.6.2 TS1 7.6.3 TS1 7.6.4 TS1 7.6.5 TS1 7.14.5 TS1 7.14.6 TS1 7.15.1 TS1 7.15.10 TS1 7.15.11 TS1 7.15.13 TS1 7.17.1 TS1 7.17.2	DD-M2-E01 DD-M2-E02 DD-M2-E03 DD-M2-E04 DD-M2-E05

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M2.1.6.	Where maintenance activities on above-ground pipework require that insulation needs to be removed, the insulation shall be refitted or replaced as soon as practically possible in accordance with the applicable technical standard(s). Where insulation is found to be wet, this shall be removed and replaced with new insulation in accordance with the applicable technical standard(s).	TS1 7.13.1	DD-M2-E16
M2.1.7.	Where there is a fault or maintenance activity on below-ground pipework that requires that pipework is removed, it shall be re-fitted in accordance with the technical standard(s).	TS1 7.16.10	DD-M2-E03 DD-M2-E11 DD-M2-E14 DD-M2-E15
M2.1.8.	Where a surveillance system is installed, this shall be maintained and utilised in accordance with the applicable technical standard(s).	TS1 7.12.8	DD-M2-E03
M2.1.9.	All Operatives responsible for carrying out operation and maintenance activities shall receive appropriate training in accordance with the applicable technical standard(s).	TS1 7.14.1	DD-M2-E06
M2.1.10.	All Operatives and Specialists responsible for carrying out operation and maintenance activities shall receive a site-specific induction in accordance with the applicable technical standard(s).	TS1 7.14.2	DD-M2-E06
M2.1.11.	The Operating Risk Register shall be maintained for the Heat Network in accordance with the applicable technical standard(s).	TS1 7.14.6 TS1 7.17.1	DD-M2-E09

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M2.1.12.	No earlier than 6 months prior to assessment, the condition of accessible (e.g. through valve chambers) equipment and pipework condition shall be determined, and any required remedial actions identified shall be resolved in accordance with the applicable technical standard(s). Following assessment at Milestone 2, the condition of equipment and pipework in the District Distribution Network shall be determined at least once per annum in accordance with the applicable technical standard(s).	TS1 7.16.1 TS1 7.16.2 TS1 7.16.3 TS1 7.16.4 TS1 7.16.5 TS1 7.16.8	DD-M2-E07
M2.1.13.	Following the assessment of pipework condition and where determined necessary, it shall be demonstrated that the destructive testing of pipework was carried out in accordance with the applicable technical standard(s).	TS1 7.16.6 TS1 7.16.7	DD-M2-E07
M2.1.14.	The Resilience Strategy shall be maintained in accordance with the applicable technical standard(s).	TS1 7.9.1 TS1 7.9.2 TS1 7.9.3 TS1 7.9.4	DD-M2-E08
M2.1.15.	The Planned Preventative Maintenance (PPM) Schedule shall include activities that sufficiently maintain the water quality of the Heat Network in accordance with the applicable technical standard(s).	TS1 7.11.8 TS1 7.11.9 TS1 7.11.10 TS1 7.11.11 TS1 7.14.6 TS1 7.15.11	DD-M2-E02

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M2.1.16.	The District Distribution Network water quality shall be maintained within the required KPI thresholds. Water quality sampling (and dosing of Chemically Treated systems) shall be carried out in accordance with the applicable technical standard(s). The applicable water quality KPIs shall be reported to HNTAS at the following intervals: • parameters measured via continuous monitoring shall be reported once per month; and • parameters measured via laboratory testing of on site samples shall be reported in accordance with sampling frequency in the applicable technical standard(s). At the point of assessment, the following data shall be provided as a minimum: • for systems without continuous monitoring, a minimum of 2 sets of samples taken 3 months apart. • for systems with continuous monitoring, a minimum of 3 months of KPI data.	TS1 7.11.1 TS1 7.11.3 TS1 7.11.4	DD-M2-E19 DD-M2-E20 DD-M2-E21
M2.1.17.	Water treatment records shall be kept detailing the: • sampling; • dosing (where applicable); and • the remedial actions carried out regarding water quality, in accordance with the applicable technical standard(s). Water quality records shall contain, for each parameter, a graphical representation where both the trend and limits can be observed.	TS1 7.11.5	DD-M2-E20

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M2.1.18.	Where stagnant conditions occur in specific parts of the District Distribution Network, circulation shall be established through these areas in accordance with the applicable technical standard(s).	TS1 7.11.12	DD-M2-E22
M2.1.19.	Installed equipment no longer in use shall be disconnected and drained in accordance with the applicable technical standard(s).	TS1 7.11.13	DD-M2-E04 DD-M2-E24
M2.1.20.	No earlier than 6 months prior to assessment, an inspection shall have been undertaken by a competent individual or individuals within a team separate to the team responsible for the District Distribution Network O&M activities, in accordance with the applicable technical standard(s). The inspection shall check against conformity with Technical Requirements and ensure that Key Failures are not occurring. Where non-conformities are identified, the report shall outline what remedial actions are required to ensure future conformity. Any reports produced through this inspection shall be uploaded to HNTAS. Following assessment at Milestone 2, an inspection shall be undertaken at least once per annum in accordance with the applicable technical standard(s).	TS1 7.15.14	DD-M2-E25
M2.1.21.	Water quality equipment shall have been installed in accordance with the applicable technical standard(s).	TS1 3.11.14 TS1 3.11.15 TS1 3.11.16	DD-M2-E26

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M2.1.22.	Working pressures shall have been calculated and determined, with risks mitigated where necessary, in accordance with the applicable technical standard(s). *Note: it is expected that this assessment has been undertaken with consideration for the other Elements present in the Heat Network.*	TS1 3.6.1 TS1 3.6.2 TS1 3.6.3 TS1 3.6.4 TS1 3.6.7 TS1 3.6.13 TS1 3.6.14	DD-M2-E27
M2.1.23.	The KPI Schedule shall be maintained with accurate information and references to relevant documentation.		DD-M2-E31
M2.1.24.	The Technical Parameters Schedule shall be maintained with accurate information and references to relevant information.		DD-M2-E32

Table 2: Technical Requirements for the District Distribution Network at Milestone 2

M2.2. Performance Monitoring Requirements

The applicable Performance Monitoring Requirements in Table 3 shall be fulfilled.

Performance Monitoring Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M2.2.1.	The Metering and Monitoring Strategy shall be maintained in accordance with the applicable technical standard(s).	TS1 7.12.2 MMS 4.1.2	DD-M2-E12
M2.2.2.	The Automatic and Remote Monitoring System (ARMS) shall be specified in accordance with the applicable technical standard(s).	TS1 3.12.5	DD-M2-E28
M2.2.3.	Monitoring Points (including all thermal energy meters, utility meters, and sensors) shall be sized and specified in accordance with the applicable technical standard(s).	TS1 3.12.2 TS1 3.12.3	DD-M2-E13 DD-M2-E29 DD-M2-E30
M2.2.4.	Thermal energy meters shall be recalibrated (where necessary) in accordance with the applicable technical standard(s).	TS1 7.12.4 TS1 7.12.5 MMS 1.1.8 MMS 1.3.3 MMS 1.3.4 MMS 1.3.5 MMS 1.3.6	DD-M2-E12 DD-M2-E13
M2.2.5.	The Metering and Monitoring System shall calculate and report, at the required interval, each applicable District Distribution Network KPI to HNTAS.		DD-M2-E17
M2.2.6.	The District Distribution Network performance shall be within the required KPI thresholds at the point of assessment. A minimum period of 3 months' worth of KPI data shall be provided at the point of assessment. Where performance deviates outside of KPI thresholds within the data provided, the Responsible Party shall outline the root cause(s) of this deviation, the remedial actions undertaken to restore the KPI to within required thresholds, and provide justification why each deviation will not impact future conformity with KPI thresholds.	TS1 7.8.1 TS1 7.8.2 TS1 7.8.6 TS1 7.12.6 TS1 7.17.4	DD-M2-E17 DD-M2-E18

Performance Monitoring Requirement	Applicable technical standard(s)	Evidence Requirement(s)
Following assessment at Milestone 2, the District Distribution Network performance shall be monitored against the KPI thresholds. Where performance is outside of KPI thresholds for a reporting interval, the Responsible Party shall outline justification for this through a note uploaded to HNTAS. Where performance is outside of KPI thresholds for 3 consecutive reporting intervals, a detailed investigation shall be undertaken by a competent individual to diagnose the root cause issue and develop a plan for remedial actions as necessary. Any remedial actions taken to rectify issues with performance shall be recorded in the Maintenance and Remedial Action Log.		

Table 3: Performance Monitoring Requirements for the District Distribution Network at Milestone 2

M2.3. Key Failures

The applicable Key Failures listed in Table 4 shall not be present.

Key Failure		Outcome to avoid	Evidence Requirement(s)
M2.3.1.	PPM personnel (or contracts) not in place and/or maintenance not scheduled at sufficient frequency, or not at all.	Maintenance not carried out on network, which could result in a reduction in performance of the District Distribution Network. This could lead to KPI thresholds not being achieved.	DD-M2-E02
M2.3.2.	Operatives carrying out maintenance activities have not received sufficient, or any training specific to the network.	Lack of awareness of network requirements and characteristics. This could lead to false diagnosis of network issues, and/or incorrect maintenance activities carried out on the network, which impacts the longevity and performance of the network.	DD-M2-E06
M2.3.3.	Bypasses, where installed, left open when should be closed, or controlled in such a way that increases flowrate and return temperature above KPI requirements.	Unnecessary increases in network flowrates, which could increase return temperatures and result in elevated energy consumption by the pumps. This may result in KPI thresholds not being achieved.	DD-M2-E17 DD-M2-E18
M2.3.4.	Ancillary equipment (e.g. isolation valves) not regularly exercised.	Valve seizure due to being left in the same position for extended periods. This could lead to the valve needing to be replaced prematurely. Significant disruption to the network could be experienced during maintenance activities as a result of sections of the network not being able to be isolated.	DD-M2-E03
M2.3.5.	Surveillance system not regularly inspected and tested (applicable for steel pipework systems).	Surveillance system faults are not detected, which could lead to leaks going undetected on the District Distribution Network. This could lead to the spread of moisture through network insulation, causing to	DD-M2-E03 DD-M2-E19 DD-M2-E20

Key Failure		Outcome to avoid	Evidence Requirement(s)
		insulation and reduced longevity.	
M2.3.6.	Surveillance system faults not addressed in a timely manner (applicable for steel pipework systems).	Faults exacerbate and become significantly more difficult to fix. Faults such as for example, leaks, would increase the spread of moisture through the network insulation and could lead to a risk of corrosion and could result in KPIs not achieving their threshold.	DD-M2-E03
M2.3.7.	Access chambers below ground are not inspected regularly for physical signs of a risk to future inaccessibility (for example, flooding) or damage.	Risk that access chambers become flooded, leading to the chamber becoming inaccessible to operation and maintenance personnel. Flooding could lead to damage to ancillary equipment, which could cause the equipment to become inoperable.	DD-M2-E03
M2.3.8.	Insulation left damaged, wet, or not reinstalled following maintenance activities.	Increased heat losses from the system due to damaged or wet insulation, or due to insulation being removed from pipework and not replaced. This could result in heat losses not achieving the KPI threshold.	DD-M2-E03 DD-M2-E16 DD-M2-E17 DD-M2-E18
M2.3.9.	Documentation not kept up to date (e.g. drawings not updated with changes to network, maintenance activities carried out not recorded, risk register not updated).	Documentation not reflective of installed network and actual operation, which can lead to incorrect maintenance, operation and maintenance of network.	DD-M2-E01 DD-M2-E03 DD-M2-E04 DD-M2-E07 DD-M2-E08 DD-M2-E09 DD-M2-E11 DD-M2-E14 DD-M2-E15
M2.3.10.	Documentation not adequately stored where they can be accessed by personnel carrying out operation and maintenance activities and/or documentation is not stored in a format	Documentation cannot be accessed and/or updated by operation and maintenance personnel to reflect changes that have been made to the District Distribution Network, which can lead to a lack of clarity on the current network status for	DD-M2-E10

Key Failure		Outcome to avoid	Evidence Requirement(s)
	where they can be updated.	future operation and maintenance activities.	
M2.3.11.	The condition of pipework or equipment condition presents an immediate risk of a major interruption to heat supply.	Increased risk of equipment failure and increased risk of interruption to heat supply.	DD-M2-E07 DD-M2-E08
M2.3.12.	Resilience Strategy not produced or is inadequate to mitigate the risks to heat supply.	Increased likelihood of an interruption to heat supply and increased impact should that interruption occur.	DD-M2-E08

Table 4: Key Failures for the District Distribution Network at Milestone 2

M2.4. Evidence Requirements

The applicable Evidence Items listed in Table 5 shall be provided to demonstrate fulfilment with the Technical Requirements, Performance Monitoring Requirements, and avoidance of Key Failures.

Evidence Item		Detailed description and requirements
DD-M2-E01	O&M Manual	A completed O&M Manual shall be provided, which shall include any changes made to the O&M manual during operation.
DD-M2-E02	Planned Preventative Maintenance (PPM) Schedule	To include a schedule outlining the operation and maintenance plan for all equipment on the District Distribution Network. Shall detail wherever Specialists or external bodies are required to carry out PPM activities.
DD-M2-E03	Maintenance and Remedial Action Log	To detail any operation and maintenance activities carried out on the District Distribution Network. Shall detail the date the activity was carried out and the person that performed the activity. Shall outline any remedial actions carried out on the network as part of the operation and maintenance activity.
DD-M2-E04	O&M Change Log	Shall be a log of any changes made to the network during operation. This includes: • changes that result in the hydraulic arrangement deviating from previous; • changes to the spatial layout of the Energy Centre; • changes to the control system, set points or Description of Operation; • changes to the Resilience Strategy; • changes to the Operating Risk Register; • equipment that has been replaced; and • Monitoring Points that have been replaced. This is not to include activities noted in the Maintenance and Remedial Action Log for the general maintenance carried out on the District Distribution Network.
DD-M2-E05	Equipment servicing certification	Shall include all servicing certification for each piece of equipment. Shall include certification at the frequency as required by the PPM Schedule. Shall include detail for each piece of equipment as required by the PPM Schedule.

Evidence Item		Detailed description and requirements
DD-M2-E06	Register of Operatives	To include a list of all personnel that have carried, or will carry out, operation and maintenance activities on the District Distribution Network. This shall include for each person: • confirmation that the person has completed a site-specific induction; • the activity(s) that the person has carried, or will carry out; • the training that the person has received in relation to the activity(s); • the relevant qualifications (where applicable) that the person has; and • the relevant experience that the person has.
DD-M2-E07	Condition Log	To include all basic asset data and condition data for all Heat Network equipment within the District Distribution Network, including: • asset name; • asset ID; • asset classification code; • asset classification description; • asset criticality; • asset maintainer; • asset location; • asset install date; • asset condition grade; • asset priority grade; • whether asset is beyond economic repair; • asset operational status; • date of last condition survey; and • remaining life expectancy (years).
DD-M2-E08	Resilience Strategy	Shall outline the Resilience Strategy for the Heat Network, including: • the redundancy and recovery measures implemented; • the disaster recovery plan; • the critical spares log; and • the plant replacement strategy. This shall contain the strategy in the case of loss of heat supply within the Heat Network, and design

Evidence Item		Detailed description and requirements
		items for resilience (for example, isolation valve locations, locations for temporary heat supply).
DD-M2-E09	Operating Risk Register	A project specific risk register which shall include all risks outlined and proposed approaches to eliminate during operation of the Heat Network, mitigate or manage these risks.
DD-M2-E10	Document Storage System Statement	Shall outline the system intended to be used for storing and accessing documentation related to the Heat Network. Shall outline any hierarchy of access to the storage system relative to the personnel carrying out operation and maintenance activities.
DD-M2-E11	District Distribution Network drawings	As-built drawings of the District Distribution Network with any necessary changes made during operation implemented. Shall include: • schematics; and • drawings (layout, plan, elevation).
DD-M2-E12	Metering and Monitoring Strategy	Shall contain a description of how data required to calculate KPIs will be measured, extracted, recorded, and stored at the required read frequency, how the raw data will be transformed, and how KPIs will be calculated and reported. The strategy shall also include: • schedule of KPIs; • schedule of Monitoring Points; • data flow diagram; • schematic with labelled Monitoring Points; and • Monitoring Point labelling strategy.
DD-M2-E13	Thermal Energy Meter Records	Shall contain record of the installation and commissioning of thermal energy meters. This shall include: • meter make; • type; • serial number; and • year of install. Shall also contain record of the recalibration date of thermal energy meters or evidence of successful sampling and testing where required in accordance with the applicable technical standard(s).

Evidence Item		Detailed description and requirements
DD-M2-E14	Surveillance System Test Certificate	Test certification following maintenance activities on a joint or section of the network to certify the surveillance system functions for that joint or section as the design intended.
DD-M2-E15	Pipework Reinstallation Certificate (following maintenance activities)	Certificate following the reinstallation of pipework during maintenance activities. Shall detail the person(s) that carried out the activities. Any updates to joints or welds shall be recorded on the certificate.
DD-M2-E16	Photographic evidence of insulation replacement	Shall include photographic evidence of areas where insulation has had to be reinstalled or replaced following maintenance activities. Photographs shall be presented clearly with no blur.
DD-M2-E17	Reporting of KPIs	A minimum of 3 months' worth of KPI data shall be reported to HNTAS at the point of assessment. Following assessment at Milestone 2, KPIs shall be reported to HNTAS at the required frequency. Where KPIs are outside of required thresholds for the reporting period, the Responsible Party shall upload a note justifying this discrepancy to HNTAS.
DD-M2-E18	KPI Remediation Report	Where any District Distribution Network KPI is not within its required threshold for 3 consecutive reporting intervals, a report shall be produced which shall outline: • the findings of the investigation undertaken by a competent individual into the root cause issue of non-conformity; and • the remedial action(s) taken, or planned to be taken, for the KPI to return to within its required threshold. Where a diagnosis is not yet known, the report shall outline a plan for acquiring a diagnosis as to why the KPI has not achieved its threshold.
DD-M2-E19	Reporting of water quality KPIs	Water quality KPIs reported to HNTAS. At the point of assessment, the following data shall be provided as a minimum: • for systems without continuous monitoring, a minimum of 2 sets of samples taken 3 months apart shall be provided. • for systems with continuous monitoring, a minimum of 3 months of KPI data shall be provided.

Evidence Item		Detailed description and requirements
		Following assessment at Milestone 2, water quality KPIs shall be reported to HNTAS at the required frequency.
DD-M2-E20	Water quality sampling records	For each sample, shall include: • hydraulic location the sample has been taken from; • date the sample has been taken; and • result of sample for each water quality KPI. Trends in water quality KPIs over time shall be graphically represented.
DD-M2-E21	Evidence of water quality specialist engagement (where applicable)	Written evidence that a water quality specialist has been engaged to carry out operation and maintenance activities on the system where KPI thresholds have not been achieved.
DD-M2-E22	Evidence of circulation provision through stagnant areas	Shall contain justification of why it is technically infeasible to remove stagnant areas. Shall contain evidence that the control system temporarily enables circulation through these stagnant areas at appropriate intervals.
DD-M2-E23	Water Quality Remedial Action Log	To detail any operation and maintenance activities carried out on the District Distribution Network to remediate water quality. Shall detail the date the activity was carried out and the person that performed the activity. Shall outline any remedial actions carried out on the network as part of the operation and maintenance activity.
DD-M2-E24	Evidence of equipment disconnection	Where equipment has been decommissioned, photographic evidence that equipment has been completely disconnected from the system.
DD-M2-E25	Annual Inspection Report	To outline the findings of the annual inspection. Shall include the current status of the control system in relation to the O&M manual.
DD-M2-E26	Evidence of water quality equipment installed	Commissioning certificates for water quality equipment installed within the District Distribution Network. Where applicable, this shall outline the required design criteria for the equipment that required commissioning and the final commissioned value for each criteria.
DD-M2-E27	System pressure assessment	Assessment of working pressures in the system.

Evidence Item		Detailed description and requirements
		Shall include: • calculation of the System Maximum Working Pressure; • calculation of the Local Maximum Working Pressure; • identification of the risks that arise as a result of calculated working pressures; • assessment of the likelihood and impact of the identified risk; • mitigation of the risks posed by working pressures (where appropriate).
DD-M2-E28	ARMS Specification Conformity Statement	Shall contain evidence that the ARMS has been specified in accordance with the applicable technical standard(s).
DD-M2-E29	Evidence of Monitoring Point Specification conformity	Shall contain evidence of how each Monitoring Point has been specified in accordance with the applicable technical standard(s).
DD-M2-E30	Meter sizing calculations	Shall outline the inputs, methodology and calculations used to size meters and applicable pipework.
DD-M2-E31	KPI Schedule	Shall contain all applicable KPIs to be met by the District Distribution Network. Shall be complete with accurate up-to-date information and contain references to relevant documentation.
DD-M2-E32	Technical Parameters Schedule	Shall contain all applicable Technical Parameters for the District Distribution Network. Shall be complete with accurate up-to-date information and contain references to relevant documentation.

Table 5: Evidence Requirements for the District Distribution Network at Milestone 2

M2.5. Key Performance Indicators

Table 6 contains the Key Performance Indicators for a District Distribution Network in an Existing Heat Network to be met at Milestone 2.

KPIs are split into two types:

1. Assessed KPIs: These are KPIs which are assessed against pre-determined thresholds throughout the Operation and Maintenance Phase in order to achieve and maintain HNTAS Certification.

2. Reported KPIs: These are KPIs which are not assessed against a pre-determined threshold through the Operation and Maintenance Phase, but still provide valuable information, so are to be reported in the same format.

The specific requirements in relation to the reporting of KPIs are included in the Performance Monitoring Requirements Section.

Figure 1 illustrates the required Monitoring Points for measuring the District Distribution Network KPIs. The Monitoring Points are also listed in Table 7, along with the data required from each Monitoring Point and the minimum read frequency. The Monitoring Points to be used to measure KPIs are illustrated in orange in Table 6.

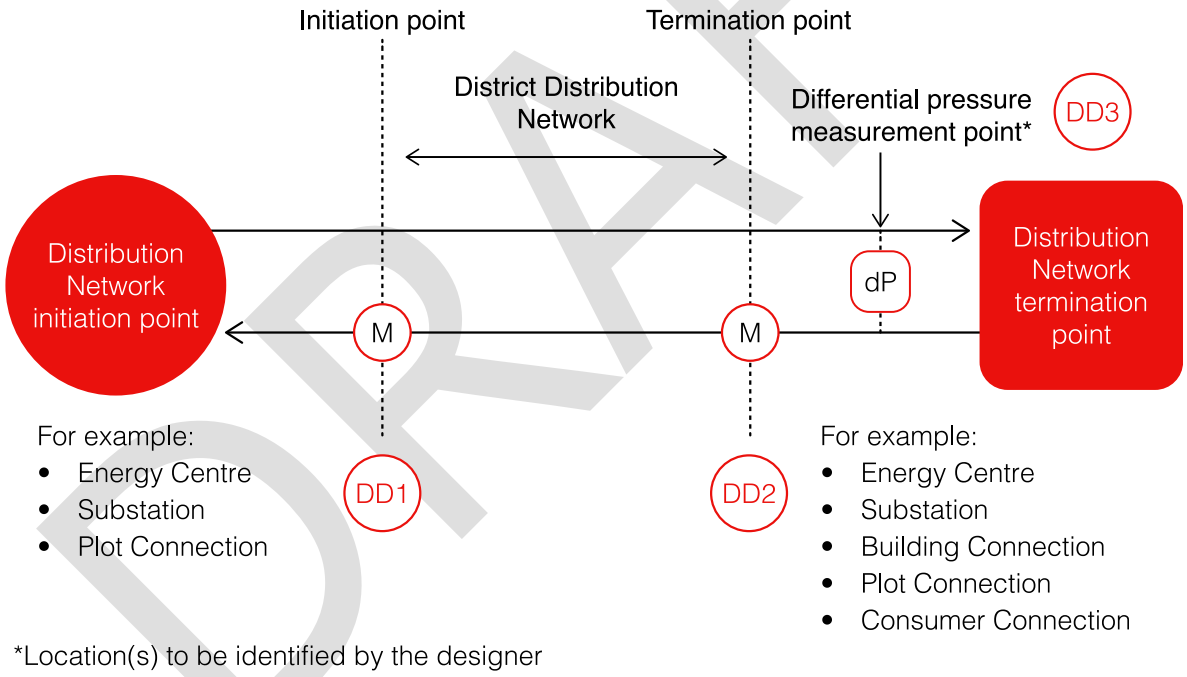

Figure 1: Diagram indicating required District Distribution Network Monitoring Points

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 2 KPI Threshold	KPI measurement frequency
DD-KPI-01	Automatic and Remote Monitoring System (ARMS) connectivity	Total number of days where Monitoring Points has connected to the ARMS within 24 hours of last connection.	(Number of Monitoring Point days) / (total Monitoring Points * total days in period). Number of Monitoring Point days = Σ number of days each Monitoring Point has connected to the ARMS within 24 hours of last connection.	Assessed KPI	≥ 99%	Monthly
DD-KPI-02	District Distribution Network Monitoring Point data completeness	Number of total reads received in comparison to the total reads expected within the given [time period] for each Monitoring Point.	(Total number of reads recorded across [time period] / total reads expected across [time period]) x 100. Total reads expected = Σ (Monitoring Point x frequency of Monitoring Point x [time period]).	Assessed KPI	≥ 95%	Monthly

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 2 KPI Threshold	KPI measurement frequency
DD-KPI-03	District Distribution Network Monitoring Points operational	Of the Monitoring Points which are connected to the ARMS (as per DD-KPI-01) and have complete data (as per DD-KPI-02), the number of which are operating as expected. Monitoring Points that are operating as expected will have (dependent on type of Monitoring Point): 1. no error codes (meters); 2. no negative readings (meters); and 3. no signals outside of operating parameters (sensors).	Verification that each Monitoring Point is operating as expected. Measurement will be dependent on ARMS and may be automated.	Assessed KPI	100% of Monitoring Points, which are connected to ARMS (as per DD-KPI-01) and have complete data (as per DD-KPI-02).	Monthly
DD-KPI-04	District Distribution Network unplanned interruptions	Number of unplanned interruptions reported per annum. A District Distribution Network interruption is defined as an event causing:	Number of unplanned interruptions = Σ (unplanned interruptions for given [time period]). *GUIDANCE:* *For networks where the District Distribution*	Assessed KPI	≤ 4 interruptions per annum. Prorated and rounded down for a reporting frequency < 12 months e.g. ≤ 1	Previous 12 months Measured on monthly rolling basis Minimum measurement

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 2 KPI Threshold	KPI measurement frequency
		• the flow temperature delivered to a District Distribution Network termination point (DD2) to be below the minimum required flow temperature for more than 12 hours, due to an issue originating in the District Distribution Network. • the differential pressure delivered to the specified differential pressure measurement point(s) (DD3) to be below minimum required differential pressure for more than 12 hours, due to an issue originating in the District Distribution Network. An unplanned interruption is an interruption as defined above, where the network end user has not been provided with at	*Network feeds Consumer Connections and end-user metering is not present at Milestone 2, additional assessment guidance is required for distinguishing interruptions in the District Distribution Network and the Consumer Connection.*		interruption for a 3 month measurement period.	period of 3 months

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 2 KPI Threshold	KPI measurement frequency
		least 48 hours written notice of such interruption.				
DD-KPI-06	District Distribution Network heat loss	Calculated heat loss between the District Distribution Network initiation point (DD1) and the District Distribution Network termination point(s) (DD2).	Heat losses (kW) = Σ (heat demand at each meter at the District Distribution Network initiation point (DD1) (kW) for given [time period]) - Σ (heat demand at each meter at the District Distribution Network termination point(s) (DD2) (kW) for given [time period]). *GUIDANCE:* *In cases where the District Distribution Network directly feeds Consumer Connections, and where end-user metering is not present at Milestone 2, an alternative reporting methodology is required.*	Reported KPI	[expected District Distribution Network heat loss]	Previous 12 months Measured on monthly rolling basis Minimum measurement period of 3 months

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 2 KPI Threshold	KPI measurement frequency
DD-KPI-07	District Distribution Network average flow temperature	Average flow temperature for given [time period] measured at the District Distribution Network initiation point (DD1).	Average flow temperature = Σ (Flow temperature at [District Distribution Network initiation point (DD1)] (°C) per time point for given [time period])/ Σ (time points for given [time period]).	Reported KPI	[expected average flow temperature]	Monthly
DD-KPI-08	District Distribution Network average return temperature	Average return temperature for given [time period] measured at the District Distribution Network initiation point (DD1).	Average return temperature = Σ (Return temperature at [District Distribution Network initiation point (DD1)] (°C) per time point for given [time period])/ Σ (time points for given [time period]).	Reported KPI	[expected average return temperature range]	Monthly
DD-KPI-09	District Distribution Network flow temperature uptime	The percentage of time spent above the minimum required flow temperature. Minimum required flow temperature will be project specific and is to be set for each District Distribution Network.	Uptime = Σ (time points spent above minimum required flow temperature for given [time period])/ Σ (time points for given [time period]). Measured at a single specified District Distribution Network termination point (DD2).	Assessed KPI	≥ 99% above [minimum required flow temperature]	Monthly

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 2 KPI Threshold	KPI measurement frequency
DD-KPI-10	District Distribution Network bypass flow rate	Sum of measured flow rates from all termination points against the flow rate measured at the initiation point.	Bypass flow rate = [(Volume delivered from District Distribution Network initiation point (DD1) (m^3) for given [time period]) - Σ (Volume consumed at all District Distribution Network termination point(s) (DD2) (m3) for given [time period])] / [time period]. *GUIDANCE: For networks where the District Distribution Network feeds Consumer Connections, and end-user metering is not present at Milestone 2, an alternative KPI is to be reported.*	Reported KPI	[expected bypass flow rate]	Monthly

Table 6: Key Performance Indicators - District Distribution Network and Milestone 2

M2.6. Monitoring Points

ID	Element	Monitoring Point	Data required at Monitoring Point	Minimum frequency of reads	Further comments
DD1	District Distribution Network	District Distribution Network initiation point	Meter read (kWh) Instantaneous power (kW) Flow rate (m^3/h or l/s) Flow temperature (°C) Return temperature (°C) Volume (m^3 or l)	30 minutes	Can be the same measurement point as an Energy Centre boundary measurement point, a Substation offtake measurement point, or a Plot/Building Connection measurement point (where not a Substation).
DD2	District Distribution Network	District Distribution Network termination point	Meter read (kWh) Instantaneous power (kW) Flow rate (m3/h or l/s) Flow temperature (°C) Return temperature (°C) Volume (m^3 or l)	30 minutes	Can be the same measurement point as a Substation intake measurement point, or a Plot/Building Connection measurement point (where not a Substation), or a Consumer Connection measurement point.
DD3	District Distribution Network	Defined differential pressure measurement point	Differential pressure (kPa, bar)	5 minutes	Location(s) shall be determined by the Designer on a project basis. Likely to be at the District Distribution Termination Point(s).

Table 7: Minimum required Monitoring Points - District Distribution Network and Milestone 2