



# **Heat Network Technical Assurance Scheme**

Existing Heat Networks

Technical Specification

Communal Distribution Network

Milestone 4

**HNTAS-EX-TS-CD-M4**

## 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](mailto: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.



© Crown copyright 2025

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated.

To view this licence, visit <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/> or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: [psi@nationalarchives.gov.uk](mailto:psi@nationalarchives.gov.uk).

Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.

## Contents

<b>Foreword</b> .....	<b>5</b>
<b>Scope</b> .....	<b>9</b>
<b>References</b> .....	<b>10</b>
Normative references .....	10
Informative references.....	10
<b>Terms and Definitions</b> .....	<b>11</b>
<b>M4. Requirements for Milestone 4</b> .....	<b>12</b>
M4.1. Technical Requirements .....	12
M4.2. Performance Monitoring Requirements .....	18
M4.3. Key Failures .....	20
M4.4. Evidence Requirements.....	24
M4.5. Key Performance Indicators.....	30
M4.6. Monitoring Points .....	38

## 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 Communal Distribution Network Element within an Existing Heat Network required at Milestone 4.

This document sits within a series of Technical Specifications for a Communal 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.

## Authors

Lucy Sherburn (FairHeat)

Jake Adamson (FairHeat)

Gareth Jones (FairHeat)

Joseph Shanley (FairHeat)

Tom Burton (FairHeat)

## Technical Sub-Working Group Members

*This group was engaged to produce the New Build Phase 4: Operation Communal Distribution Network Technical Specification, which was used as the foundation for producing this document.*

Nathan Barrington (Southern Housing)

Ghassan Beldawi (L&Q)

Richard Bolton (WSP)

James Byass (Max Fordham)

Nigel Green (Higgins Partnerships)

Steve Harper (Independent)

Richard Hanson-Graville (MEHNA and Heatweb Solutions Ltd.)

Rhys Jones Mathias (Switch2)

Marc Nickels (Kingspan)

Iona Norton (Greenwich)

Matt Oliver (NHG)

Georgia Pringle (Equans)

Chris Ridge (TICA)

Elliot Sharpe (Vital Energi)

Hannah Southan (Anthesis)

Tom Naughton (FairHeat)

Paul Wightman (Danfoss)

## 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

DRAFT

## 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 Communal Distribution Network within an Existing Heat Network at Milestone 4.

Following demonstration of conformity with Milestone 4, ongoing requirements are set out in the Heat Network Technical Assurance Scheme – New Build Heat Networks – Technical Specification – Communal Distribution Network – Phase 4: Operation (HNTAS-NB-TS-CD-P4) document.

A Communal Distribution Network is defined as any pipework system that is wholly within a building and distributes thermal energy from either an Energy Centre or Building Connection to multiple Consumer Connections.

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

DRAFT

## 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 – New Build Heat Networks – Technical Specification – Communal Distribution Network – Phase 4: Operation (HNTAS-NB-TS-CD-P4)
- 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.

DRAFT

## M4. Requirements for Milestone 4

### M4.1. Technical Requirements

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

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M4.1.1.	The O&M Manual shall be up-to-date in accordance with the applicable technical standard(s).	TS1 7.17.3 TS1 7.17.6	CD-M4-E01 CD-M4-E04
M4.1.2.	The Planned Preventative Maintenance (PPM) Schedule shall be in accordance with the applicable technical standard(s).	TS1 7.6.5 TS1 7.12.4 TS1 7.12.5 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 7.15.11 TS1 7.17.2  MMS 1.1.8 MMS 1.3.3 MMS 1.3.4 MMS 1.3.5 MMS 1.3.6	CD-M4-E02
M4.1.3.	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	CD-M4-E01 CD-M4-E04 CD-M4-E11 CD-M4-E22
M4.1.4.	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	CD-M4-E10

Technical Requirement	Applicable technical standard(s)	Evidence Requirement(s)
<p>M4.1.5. The Communal Distribution Network shall be maintained in accordance with:</p> <ul style="list-style-type: none"> <li>the O&amp;M Manual(s);</li> <li>the PPM Schedule;</li> <li>any manufacturers requirements; and</li> <li>the applicable technical standard(s).</li> </ul> <p>A minimum of 6 months of evidence shall be provided to demonstrate this at Milestone 4.</p>	<p>TS1 7.6.1 TS1 7.6.2 TS1 7.6.3 TS1 7.6.4 TS1 7.6.5 TS1 7.12.4 TS1 7.12.5 TS1 7.13.1 TS1 7.14.5 TS1 7.14.6 TS1 7.15.1 TS1 7.15.10 TS1 7.15.11 TS1 7.17.1 TS1 7.17.2  MMS 1.1.8 MMS 1.3.3 MMS 1.3.4 MMS 1.3.5 MMS 1.3.6</p>	<p>CD-M4-E01 CD-M4-E02 CD-M4-E03 CD-M4-E04 CD-M4-E05</p>
<p>M4.1.6. Where maintenance activities 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).</p> <p>Where insulation is found to be wet, this shall be removed and replaced with new insulation in accordance with the applicable technical standard(s).</p>	<p>TS1 7.13.1</p>	<p>CD-M4-E02 CD-M4-E25</p>
<p>M4.1.7. All Operatives responsible for carrying out operation and maintenance activities shall have received appropriate training in accordance with the applicable technical standard(s).</p>	<p>TS1 7.14.1</p>	<p>CD-M4-E06</p>
<p>M4.1.8. All Operatives and Specialists responsible for carrying out operation and maintenance activities shall have received a site-specific induction in accordance with the applicable technical standard(s).</p>	<p>TS1 7.14.2</p>	<p>CD-M4-E06</p>
<p>M4.1.9. The Operating Risk Register shall be up-to-date in accordance with the applicable technical standard(s).</p>	<p>TS1 7.14.6 TS1 7.17.1</p>	<p>CD-M4-E09</p>

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M4.1.10.	No earlier than 6 months prior to assessment, the condition of equipment and pipework in the Communal Distribution Network shall be determined, and any required remedial actions identified shall be resolved 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	CD-M4-E07
M4.1.11.	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	CD-M4-E07
M4.1.12.	The Resilience Strategy shall be up-to-date in accordance with the applicable technical standard(s).	TS1 7.9.1 TS1 7.9.2 TS1 7.9.3 TS1 7.9.4	CD-M4-E08 CD-M4-E09
M4.1.13.	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 7.14.6 TS1 7.15.11	CD-M4-E02

Technical Requirement	Applicable technical standard(s)	Evidence Requirement(s)
<p>M4.1.14. The Communal Distribution Network water quality shall be maintained within the required KPI thresholds.</p> <p>Water quality sampling (and dosing of Chemically Treated systems) shall be carried out in accordance with the applicable technical standard(s).</p> <p>The applicable water quality KPIs shall be reported to HNTAS at the following intervals:</p> <ul style="list-style-type: none"> <li>parameters measured via continuous monitoring shall be reported once per month; and</li> <li>parameters measured via laboratory testing of on site-samples shall be reported in accordance with sampling frequency in the applicable technical standard(s).</li> </ul> <p>The following data shall be provided as a minimum:</p> <ul style="list-style-type: none"> <li>for systems without continuous monitoring, a minimum of 2 sets of samples taken 3 months apart; or</li> <li>for systems with continuous monitoring, a minimum of 3 months of KPI data.</li> </ul>	<p>TS1 7.11.1 TS1 7.11.3 TS1 7.11.4</p>	<p>CD-M4-E14 CD-M4-E15</p>
<p>M4.1.15. Water treatment records shall be kept detailing the:</p> <ul style="list-style-type: none"> <li>sampling;</li> <li>dosing (where applicable); and</li> <li>the remedial actions carried out regarding water quality,</li> </ul> <p>in accordance with the applicable technical standard(s).</p> <p>Water quality records shall contain, for each parameter, a graphical representation where both the trend and limits can be observed.</p>	<p>TS1 7.11.5</p>	<p>CD-M4-E15</p>

Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M4.1.16.	Where stagnant conditions occur in specific parts of the Communal Distribution Network, circulation shall be established through these areas in accordance with the applicable technical standard(s).	TS1 7.11.12	CD-M4-E17
M4.1.17.	Installed equipment no longer in use shall have been disconnected and drained in accordance with the applicable technical standard(s).	TS1 7.11.13	CD-M4-E04 CD-M4-E31
M4.1.18.	<p>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 Communal Distribution Network O&amp;M activities, in accordance with the applicable technical standard(s).</p> <p>The inspection shall check against conformity with Technical Requirements and ensure that Key Failures are not occurring.</p> <p>Where non-conformities are identified, the report shall outline what remedial actions are required to ensure future conformity.</p> <p>Any reports produced through this inspection shall be uploaded to HNTAS.</p>	TS1 7.15.14	CD-M4-E19
M4.1.19.	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	CD-M4-E20
M4.1.20.	<p>Working pressures shall have been calculated and determined, with risks mitigated where necessary, in accordance with the applicable technical standard(s).</p> <p><i>Note: it is expected that this assessment has been undertaken with consideration for the other Elements present in the Heat Network.</i></p>	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	CD-M4-E21



Technical Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M4.1.21.	Where applicable, it shall be demonstrated that all required Statements of Conformity have been obtained for any Assessed Works as per the Heat Network Technical Assurance Scheme – Ongoing Regime – Scheme Rules – Replacement Regime (HNTAS-ON-SR-XX-RR) document.		CD-M4-E27
M4.1.22.	The KPI Schedule shall be up-to-date with accurate information and references to relevant documentation.		CD-M4-E29
M4.1.23.	The Technical Parameters Schedule shall be up-to-date with accurate information and references to relevant information.		CD-M4-E30

*Table 2: Technical Requirements for the Communal Distribution Network at Milestone 4*

## M4.2. Performance Monitoring Requirements

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

Performance Monitoring Requirement		Applicable technical standard(s)	Evidence Requirement(s)
M4.2.1.	The Metering and Monitoring Strategy shall be up-to-date in accordance with the applicable technical standard(s).	TS1 7.12.2 MMS 4.1.2	CD-M4-E22
M4.2.2.	The Automatic and Remote Monitoring System (ARMS) shall be specified in accordance with the applicable technical standard(s).	TS1 3.12.5	CD-M4-E23
M4.2.3.	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	CD-M4-E24 CD-M4-E25 CD-M4-E26
M4.2.4.	Thermal energy meters shall have been 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	CD-M4-E22 CD-M4-E26
M4.2.5.	The Metering and Monitoring System shall calculate and report, at the required interval, each applicable Communal Distribution Network KPI to HNTAS.		

Performance Monitoring Requirement	Applicable technical standard(s)	Evidence Requirement(s)
<p>M4.2.6. The Communal Distribution Network performance shall be within the required KPI thresholds at the point of assessment.</p> <p>A minimum period of 3 months worth of KPI data shall be provided at the point of assessment.</p> <p>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.</p>	<p>TS1 7.8.1 TS1 7.8.2 TS1 7.8.6 TS1 7.12.6 TS1 7.17.4</p>	<p>CD-M4-E12 CD-M4-E13</p>

*Table 3: Performance Monitoring Requirements for the Communal Distribution Network at Milestone 4*

### M4.3. Key Failures

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

Key Failure		Outcome to avoid	Evidence Requirement(s)
M4.3.1.	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 Communal Distribution Network. This could lead to KPI thresholds not being achieved.	CD-M4-E02
M4.3.2.	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.	CD-M4-E06
M4.3.3.	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.	CD-M4-E03 CD-M4-E12 CD-M4-E13

Key Failure		Outcome to avoid	Evidence Requirement(s)
M4.3.4.	Inspection and maintenance of air vents not regularly carried out.	<p>Leaking air vents are left isolated from the network, which could cause air pockets to form in the network. This could increase the risk of corrosion in pipework, reduce the network water quality and increase the maintenance and replacement requirements of pipework and equipment.</p> <p>Leaks not detected from air vents. Air vents not being replaced when they leak, leading to damage to insulation, external corrosion of pipework and major leaks from the network.</p>	CD-M4-E03 CD-M4-E14 CD-M4-E15
M4.3.5.	Expansion equipment (e.g. bellows) not regularly inspected for physical evidence of poor condition.	Increased risk of failure of bellows when bellows not inspected for poor condition, leading to catastrophic outcomes such as major leaks and extended outages of the Heat Network.	CD-M4-E03 CD-M4-E12 CD-M4-E13
M4.3.6.	Leaking and/or weeping items left unrectified.	<p>Increased water consumption of the network, leading to issues with water quality and reduced equipment longevity.</p> <p>Insulation becoming wet, increasing the heat losses from the network, and increasing the likelihood of pipework corrosion.</p>	CD-M4-E03 CD-M4-E14 CD-M4-E15 CD-M4-E28
M4.3.7.	Water quality sampling not undertaken in accordance with industry standards.	Unable to identify issues with water quality in the Communal Distribution Network. This could lead to reduced equipment longevity and increased maintenance requirements for equipment.	CD-M4-E03 CD-M4-E14 CD-M4-E15

Key Failure		Outcome to avoid	Evidence Requirement(s)
M4.3.8.	Remedial actions not undertaken to fix water quality parameters trending towards, or outside of the permitted water quality limits.	Reduced efficiency of equipment due to poor water quality. Increased likelihood of equipment failure, which would require increased maintenance.	CD-M4-E03 CD-M4-E14 CD-M4-E15 CD-M4-E16 CD-M4-E18
M4.3.9.	Insulation left damaged, wet, or not reinstalled following maintenance activities.	Increased heat losses from the network 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.	CD-M4-E03 CD-M4-E12 CD-M4-E13 CD-M4-E28
M4.3.10.	Monitoring Points not producing reasonable and expected data.	Unable to accurately monitor performance and risks falsely being able to achieve or not achieve KPI thresholds.	CD-M4-E12
M4.3.11.	Monitoring Points not communicating with ARMS.	ARMS unable to extract, record and store data from Monitoring Point, and therefore KPIs cannot be calculated, and performance monitored.	CD-M4-E12
M4.3.12.	Monitoring Point faults not identified and rectified.  This includes batteries not being replaced where battery powered meters are installed.	Unable to measure performance data required for KPIs.	CD-M4-E03 CD-M4-E12 CD-M4-E13
M4.3.13.	Faults with ARMS not identified and rectified (e.g. gateways faulty).	Unable to monitor performance - extract, record, and store data, or calculate and report on KPIs.	CD-M4-E03 CD-M4-E12 CD-M4-E13
M4.3.14.	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.	CD-M4-E11

Key Failure	Outcome to avoid	Evidence Requirement(s)
<p>M4.3.15. 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 where they can be updated.</p> <p>This includes being stored within the Energy Centre or Substation serving the network, electronically (where applicable) and retaining a backup version of documentation.</p>	<p>Documentation cannot be accessed and/or updated by operation and maintenance personnel to reflect changes that have been made to the Communal Distribution Network, which can lead to a lack of clarity on the current network status for future operation and maintenance activities.</p>	<p>CD-M4-E10</p>
<p>M4.3.16. The condition of pipework or equipment presents an immediate risk to of a major interruption to heat supply.</p>	<p>Increased risk of equipment failure and increased risk of interruption to heat supply.</p>	<p>CD-M4-E07 CD-M4-E08</p>
<p>M4.3.17. Resilience Strategy not produced or is inadequate to mitigate the risks to heat supply.</p>	<p>Increased likelihood of an interruption to heat supply and increased impact should that interruption occur.</p>	<p>CD-M4-E08</p>

Table 4: Key Failures for the Communal Distribution Network at Milestone 4

## M4.4. 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
CD-M4-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.
CD-M4-E02	Planned Preventative Maintenance (PPM) Schedule	To include a schedule outlining the operation and maintenance plan for all equipment on the Communal Distribution Network.  Shall detail wherever Specialists or external bodies are required to carry out PPM activities.
CD-M4-E03	Maintenance and Remedial Action Log	To detail any operation and maintenance activities carried out on the Communal 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.
CD-M4-E04	O&M Change Log	Shall be a log of any changes made to the network during operation. This includes: <ul style="list-style-type: none"> <li>• changes that result in the hydraulic arrangement deviating from previous;</li> <li>• changes to the spatial layout of the Communal Distribution Network;</li> <li>• changes to the control system, set points or Description of Operation;</li> <li>• changes to the Resilience Strategy;</li> <li>• changes to the Operating Risk Register;</li> <li>• equipment that has been replaced; and</li> <li>• Monitoring Points that have been replaced.</li> </ul> This is not to include activities noted in the maintenance and remedial action log for the general maintenance carried out on the Communal Distribution Network.
CD-M4-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
CD-M4-E06	Register of Operatives	<p>To include a list of all personnel that carry out, or will carry out operation and maintenance activities on the Communal Distribution Network.</p> <p>This shall include for each person:</p> <ul style="list-style-type: none"> <li>• confirmation that the person has completed a site specific induction;</li> <li>• the activity(s) that the person has carried, or will carry out;</li> <li>• the training that the person has received in relation to the activity(s);</li> <li>• the relevant qualifications (where applicable) that the person has; and</li> <li>• the relevant experience that the person has.</li> </ul>
CD-M4-E07	Condition Log	<p>To include all basic asset data and condition data for all Heat Network equipment within the Communal Distribution Network, including:</p> <ul style="list-style-type: none"> <li>• asset name;</li> <li>• asset ID;</li> <li>• asset classification code;</li> <li>• asset classification description;</li> <li>• asset criticality;</li> <li>• asset maintainer;</li> <li>• asset location;</li> <li>• asset install date;</li> <li>• asset condition grade;</li> <li>• asset priority grade;</li> <li>• whether asset is beyond economic repair;</li> <li>• asset operational status;</li> <li>• date of last condition survey; and</li> <li>• remaining life expectancy (years).</li> </ul>

Evidence Item		Detailed description and requirements
CD-M4-E08	Resilience Strategy	<p>Shall outline the Resilience Strategy for the Heat Network, including:</p> <ul style="list-style-type: none"> <li>the redundancy and recovery measures implemented;</li> <li>the disaster recovery plan;</li> <li>the critical spares log; and</li> <li>the plant replacement strategy.</li> </ul> <p>This shall contain the strategy in the case of loss of heat supply within the Heat Network, and design items for resilience (for example, isolation valve locations, locations for temporary heat supply).</p>
CD-M4-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.
CD-M4-E10	Document Storage System Statement	<p>Shall outline the system intended to be used for storing and accessing documentation related to the Heat Network.</p> <p>Shall outline any hierarchy of access to the storage system relative to the personnel carrying out operation and maintenance activities.</p>
CD-M4-E11	Communal Distribution Network drawings	<p>As-built drawings of the Communal Distribution Network with any necessary changes made during operation implemented.</p> <p>Shall include:</p> <ul style="list-style-type: none"> <li>schematics; and</li> <li>drawings (layout, plan, elevation).</li> </ul>
CD-M4-E12	Reporting of KPIs	<p>A minimum of 3 months worth of KPI data shall be reported to HNTAS at the point of assessment.</p> <p>Where KPIs are outside of required thresholds for the reporting period, the Responsible Party shall provide a note justifying this discrepancy to the HNTAS.</p>

Evidence Item		Detailed description and requirements
CD-M4-E13	KPI Remediation Report	<p>Where any Communal Distribution Network KPI is not within its required threshold for 3 consecutive reporting intervals, a report shall be produced which shall outline:</p> <ul style="list-style-type: none"> <li>the findings of the investigation undertaken by a competent individual into the root cause issue of non-conformity; and</li> <li>the remedial action(s) taken, or planned to be taken, for the KPI to return to within its required threshold.</li> </ul> <p>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.</p>
CD-M4-E14	Reporting of water quality KPIs	<p>Water quality KPIs reported to HNTAS.</p> <p>At the point of assessment, the following data shall be provided as a minimum:</p> <ul style="list-style-type: none"> <li>for systems without continuous monitoring, a minimum of 2 sets of samples taken 3 months apart shall be provided; or</li> <li>for systems with continuous monitoring, a minimum of 3 months of KPI data shall be provided.</li> </ul>
CD-M4-E15	Water quality sampling records	<p>For each sample, shall include:</p> <ul style="list-style-type: none"> <li>hydraulic location the sample has been taken from;</li> <li>date the sample has been taken; and</li> <li>result of sample for each water quality KPI.</li> </ul> <p>Trends in water quality KPIs over time shall be graphically represented.</p>
CD-M4-E16	Evidence of water quality specialist engagement (where applicable)	<p>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.</p>
CD-M4-E17	Evidence of circulation provision through stagnant areas	<p>Shall contain justification of why it is technically infeasible to remove stagnant areas.</p> <p>Shall contain evidence that the control system temporarily enables circulation through these stagnant areas at appropriate intervals.</p>

Evidence Item		Detailed description and requirements
CD-M4-E18	Water Quality Remedial Action Log	<p>To detail any operation and maintenance activities carried out on the Communal Distribution Network to remediate water quality.</p> <p>Shall detail the date the activity was carried out and the person that performed the activity.</p> <p>Shall outline any remedial actions carried out on the network as part of the operation and maintenance activity.</p>
CD-M4-E19	Annual Inspection Report	<p>To outline the findings of the annual inspection.</p> <p>Shall include the current status of the control system in relation to the O&amp;M manual.</p>
CD-M4-E20	Evidence of water quality equipment installed	<p>Commissioning certificates for water quality equipment installed on the Communal Distribution Network.</p> <p>Where applicable, this shall outline the required design criteria for the equipment that required commissioning and the final commissioned value for each criteria.</p>
CD-M4-E21	System Pressure Assessment	<p>Assessment of working pressures in the system.</p> <p>Shall include:</p> <ul style="list-style-type: none"> <li>• calculation of the System Maximum Working Pressure;</li> <li>• calculation of the Local Maximum Working Pressure;</li> <li>• identification of the risks that arise as a result of calculated working pressures;</li> <li>• assessment of the likelihood and impact of the identified risk; and</li> <li>• mitigation of the risks posed by working pressures (where appropriate).</li> </ul>
CD-M4-E22	Metering and Monitoring Strategy	<p>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.</p> <p>The strategy shall also include:</p> <ul style="list-style-type: none"> <li>• schedule of KPIs;</li> <li>• schedule of Monitoring Points;</li> <li>• data flow diagram;</li> <li>• schematic with labelled Monitoring Points; and</li> <li>• Monitoring Point labelling strategy.</li> </ul>

Evidence Item		Detailed description and requirements
CD-M4-E23	ARMS Specification Conformity Statement	Shall contain evidence that the ARMS has been specified in accordance with the applicable technical standard(s).
CD-M4-E24	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).
CD-M4-E25	Meter sizing calculations	Shall outline the inputs, methodology and calculations used to size meters and applicable pipework.
CD-M4-E26	Thermal Energy Meter Records	<p>Shall contain record of the installation and commissioning of thermal energy meters. This shall include:</p> <ul style="list-style-type: none"> <li>• meter make;</li> <li>• type;</li> <li>• serial number; and</li> <li>• year of install.</li> </ul> <p>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).</p>
CD-M4-E27	Assessed Works Statements of Conformity	Evidence that, where required as per the Heat Network Technical Assurance Scheme – Ongoing Regime – Scheme Rules – Replacement Regime (HNTAS-ON-SR-XX-RR), applicable works have successfully completed assessment.
CD-M4-E28	Photographic evidence of insulation replacement	<p>Shall include photographic evidence of areas where insulation has had to be reinstalled or replaced following maintenance activities.</p> <p>Photographs shall be presented clearly with no blur.</p>
CD-M4-E29	KPI Schedule	Shall contain all applicable KPIs to be met by the Communal Distribution Network. Shall be complete with accurate up-to-date information and contain references to relevant documentation.
CD-M4-E30	Technical Parameters Schedule	Shall contain all applicable Technical Parameters for the Communal Distribution Network. Shall be complete with accurate up-to-date information and contain references to relevant documentation.
CD-M4-E31	Evidence of equipment disconnection	Where equipment has been decommissioned, photographic evidence that equipment has been completely disconnected from the system.

Table 5: Evidence Requirements for the Communal Distribution Network at Milestone 4

## M4.5. Key Performance Indicators

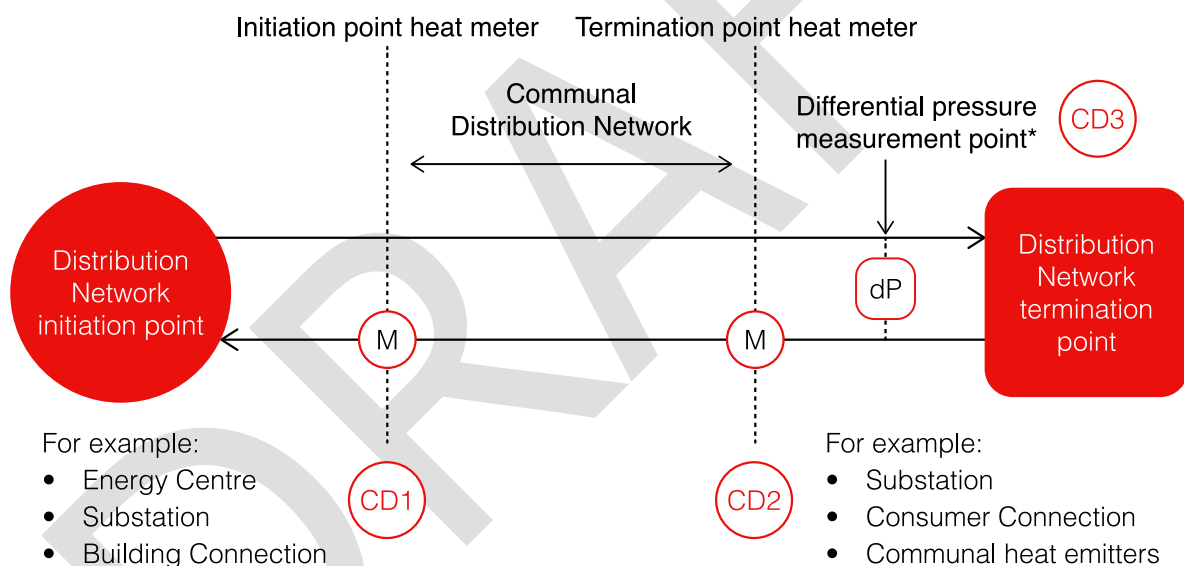
Table 6 contains the Key Performance Indicators for a Communal Distribution Network in an Existing Heat Network to be met at Milestone 4.

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 Communal 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.



\*Location(s) to be identified by the designer

**Figure 1: Diagram indicating required Communal Distribution Network Monitoring Points**

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 4 KPI Threshold	KPI measurement frequency
CD-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.	<p>(Number of Monitoring Point days) / (total Monitoring Points * total days in period)</p> <p>Number of Monitoring Point days = <math>\sum</math> number of days each Monitoring Point has connected to the ARMS within 24 hours of last connection.</p>	Assessed KPI	$\geq 99\%$	Monthly
CD-KPI-02	Communal 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.	<p>(Total number of reads recorded across [time period] / total reads expected across [time period]) x 100</p> <p>Total reads expected = <math>\sum</math> (Monitoring Point x frequency of Monitoring Point x [time period])</p>	Assessed KPI	$\geq 95\%$	Monthly

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 4 KPI Threshold	KPI measurement frequency
CD-KPI-03	Communal Distribution Network Monitoring Points operational	<p>Of the Monitoring Points which are connected to the ARMS (as per CD-KPI-01), and have complete data (as per CD-KPI-02), the number of which are operating as expected.</p> <p>Monitoring Points that are operating as expected will have (dependent on type of Monitoring Point):</p> <ol style="list-style-type: none"> <li>1. No error codes (meters)</li> <li>2. No negative readings (meters)</li> <li>3. No signals outside of operating parameters (sensors)</li> </ol>	<p>Verification that each Monitoring Point is operating as expected.</p> <p>Measurement will be dependent on ARMS and may be automated.</p>	Assessed KPI	100% of Monitoring Points, which are connected to ARMS (as per CD-KPI-01) and have complete data (as per CD-KPI-02)	Monthly
CD-KPI-04	Communal Distribution Network unplanned interruptions	<p>Number of unplanned interruptions reported per annum for a Heat Network.</p> <p>A Communal Distribution Network interruption is</p>	<p>Number of unplanned interruptions = <math>\sum</math> (unplanned interruptions for given [time period]).</p> <p><b><i>GUIDANCE:</i></b> <i>Responsible Party to state the location of the</i></p>	Assessed KPI	<p><math>\leq 3</math> interruptions per annum.</p> <p>Prorated and rounded down for a reporting frequency <math>&lt; 12</math> months e.g. <math>\leq 0</math> interruption for a 3</p>	<p>Previous 12 months</p> <p>Measured on monthly rolling basis</p> <p>Minimum measurement</p>



KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 4 KPI Threshold	KPI measurement frequency
		<p>defined as an event causing:</p> <ul style="list-style-type: none"> <li>The flow temperature at the <b>Communal Distribution Network termination point (CD2)</b> to be below the minimum required flow temperature for more than 12 hours, due to an issue originating in the Communal Distribution Network.</li> <li>The differential pressure at the <b>Communal Distribution Network termination point or alternative specified differential pressure measurement point (CD3)</b> (note this location may change during operation) to be below the minimum required differential pressure for more than 12 hours, due to an issue originating in the</li> </ul>	<i>differential pressure measurement point(s).</i>		month measurement period.	period of 3 months

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 4 KPI Threshold	KPI measurement frequency
		<p>Communal Distribution Network.</p> <p>An unplanned interruption is an interruption as defined above, where the network end user has not been provided with at least 48 hours written notice of such interruption.</p>				
CD-KPI-05	Communal Distribution Network planned interruptions	<p>Number of planned interruptions reported per annum.</p> <p>A Communal Distribution Network interruption is defined as an event causing:</p> <ul style="list-style-type: none"> <li>The flow temperature at the <b>Communal Distribution Network termination point (CD2)</b> to be below the minimum required flow temperature for more than 12 hours, due to an issue originating in the Communal Distribution Network.</li> </ul>	<p>Number of planned interruptions = <math>\Sigma</math> (planned interruptions for given [time period]).</p> <p><b><i>GUIDANCE:</i></b> <i>Responsible Party to state the location of the differential pressure measurement point(s).</i></p>	Assessed KPI	$\leq 1$ interruption per annum.	<p>Previous 12 months</p> <p>Measured on a monthly rolling basis</p> <p>Minimum measurement period of 3 months</p>

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 4 KPI Threshold	KPI measurement frequency
		<ul style="list-style-type: none"> <li>The differential pressure at the Communal Distribution Network termination point or alternative specified differential pressure measurement point (CD3) (note this location may change during operation) to be below the minimum required differential pressure for more than 12 hours, due to an issue originating in the Communal Distribution Network.</li> </ul> <p>A planned interruption is an interruption as defined above where notice has been given to the end user at least 48 hours prior to the interruption occurring.</p>				

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 4 KPI Threshold	KPI measurement frequency
CD-KPI-06	Communal Distribution Network heat loss	Calculated heat loss between the <b>Communal Distribution Network initiation point (CD1)</b> thermal energy meter and the <b>Communal Distribution Network termination point(s) (CD2)</b> thermal energy meter(s).	Heat losses (kW) = $\sum$ (heat demand at the <b>Communal Distribution Network initiation point (CD1)</b> (kW) for given [time period]) - $\sum$ (heat demand at each meter at the <b>Communal Distribution Network termination point(s) (CD2)</b> (kW) for given [time period])	Assessed KPI	$\leq$ [domestic threshold] + [non-domestic threshold] Domestic threshold: $\leq 1752$ kWh/dwelling/year OR $\leq 200$ W/dwelling Non-domestic threshold: $\leq 4.44$ W/kW capacity OR $\leq 38,933$ kWh/MW/year	Previous 12 months Measured on monthly rolling basis Minimum measurement period of 3 months
CD-KPI-07	Communal Distribution Network average flow temperature	Average flow temperature for given [time period] measured at the <b>Communal Distribution Network initiation point (CD1)</b> .	Average flow temperature = $\sum$ (Flow temperature at each time point for given [time period]) / $\sum$ (time points for given [time period])	Reported KPI	[expected average flow temperature]	Monthly
CD-KPI-08	Communal Distribution Network average return temperature	Average return temperature for given [time period] measured at the <b>Communal Distribution Network initiation point (CD1)</b> .	Average return temperature = $\sum$ (Return temperature at each time point for given [time period]) / $\sum$ (time points for given [time period])	Reported KPI	[expected average return temperature range]	Monthly

KPI ID	KPI	KPI description	KPI measurement methodology	Assessed KPI or Reported KPI	Milestone 4 KPI Threshold	KPI measurement frequency
CD-KPI-09	Communal 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 = $\frac{[(\text{Volume delivered from Communal Distribution Network initiation point (CD1)} (\text{m}^3) \text{ for given [time period]}) - \sum (\text{Volume consumed at all Communal Distribution Network termination point(s) (CD2)} (\text{m}^3) \text{ for given [time period]})]}{[\text{time period}]}$	Assessed KPI	$\leq 1\%$ of peak load flow rate. Justification to be provided where bypass flow rate is $\geq 1\%$ .	Monthly

Table 6: Key Performance Indicators - Communal Distribution Network and Milestone 4

## M4.6. Monitoring Points

ID	Element	Monitoring Point	Data required at Monitoring Point	Minimum frequency of reads	Further comments
CD1	Communal Distribution Network	Communal Distribution Network initiation point	Meter read (kWh) Instantaneous power (kW) Flow rate (m <sup>3</sup> /h or l/s) Flow temperature (°C) Return temperature (°C) Volume (m <sup>3</sup> or l)	30 minutes	Can be the same measurement point as an Energy Centre boundary measurement point, Communal Distribution Network intake measurement point, or a Plot/Building Connection measurement point (where not a Communal Distribution Network).
CD2	Communal Distribution Network	Communal Distribution Network termination point	Meter read (kWh) Instantaneous power (kW) Flow rate (m <sup>3</sup> /h or l/s) Flow temperature (°C) Return temperature (°C) Volume (m <sup>3</sup> or l)	30 minutes	Can be the same measurement point as a Communal Distribution Network offtake measurement point, a Plot/Building Connection measurement point (where not a Communal Distribution Network), a Communal Distribution Network communal area measurement point, or a Consumer Connection measurement point.
CD3	Communal 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 located at the top of riser(s) or index termination point(s).

Table 7: Minimum required Monitoring Points - Communal Distribution Network and Milestone 4