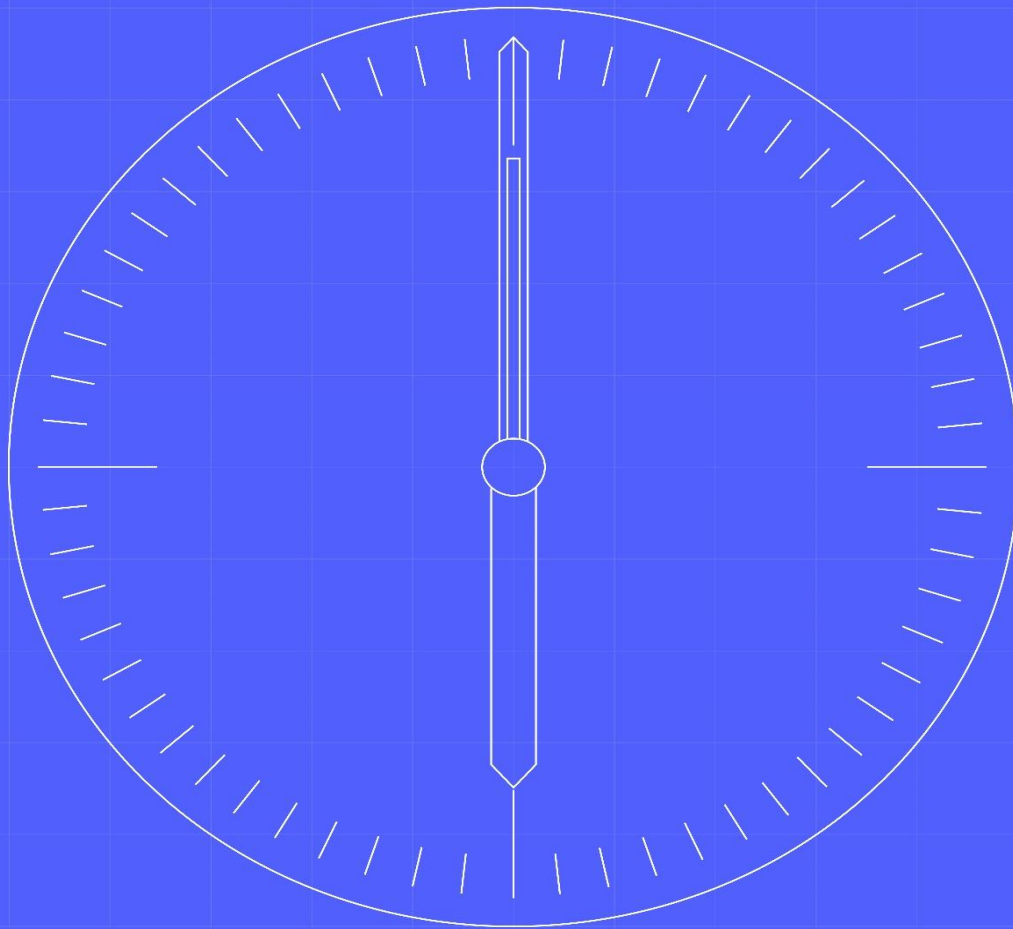




SIT Functional Test Approach & Plan



Document owner
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Status:
Approved

Document number
MHHS-DEL1259
Date
16th August 2023

Version
1.0
Classification
Public



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1.1 Change Record

Date	Author(s)	Version	Change Detail
12/06/2023	Dominic Mooney	0.1	Initial Draft
30/06/2023	Dominic Mooney	0.2	Updates following SRO and Code Body review
27/07/2023	Dominic Mooney	0.3	Changes in response to industry consultation comments – see section 3.4 summary of changes.
08/08/2023	Dominic Mooney	0.4	2 minor changes - see section 3.4 summary of changes.
16/08/2023	Dominic Mooney	1.0	Baselined at v1.0 following Aug 23 TMAG approval.

1.2 Reviewers

Reviewer	Role
Lee Cox	SI Test Manager
Kevin Davis	SI Test Architect
Cesar Lopes	SI Data Architect
Simon Berry	SI Environments and Release Manager
Chan Dabare	SRO Function Programme Test Manager
Smitha Pichrikat	SRO Function Client Delivery Manager
Code Bodies (BSC and REC)	Various

1.3 References

Ref No.	Document/Link	Publisher	Published	Additional Information
REF-01	MHHS-DEL315 - E2E Testing & Integration Strategy	SI Testing	29 th April 2022	
REF-02	MHHS-DEL852 - Pre-Integration Test Guidance	SI Testing	3 rd April 2023	
REF-03	MHHS-DEL618 - Environment Approach & Plan	SI Testing	28 th February 2023	
REF-04	MHHS-DEL1089 - Release and Configuration Management Approach & Plan	SI Testing	17 th May 2023	
REF-05	MHHS-DEL813 - Overarching Test Data Approach and Plan	SI Testing	5 th May 2023	
REF-06	MHHS-DEL1064 - Placing Reliance Policy	SI Testing	27 th April 2023	
REF-07	MHHS-DEL466 - Defect Management Plan	SI Testing	23 rd May 2023	
REF-08	MHHS-DEL1117 - SIT Functional Test Scenarios	SI Testing	15 th May 2023	
REF-09	MHHS-DEL030 - Programme Governance Framework	PMO	08 th Mar 2023	
REF-10	MHHS-DEL1140 - Milestone Register	PMO	26 th May 2023	
REF-11	MHHS-DEL1332 - Test Management Tool User Guide	SI Testing	16 th June 2023	
REF-12	MHHS-DEL1367 - SIT Functional Test Data Approach and Plan	SI Testing	In conjunction with this document	
REF-13	MHHS-DEL1139 - MHHS Outline Plan	SI Testing	See MHHS Website	

1.4 Terminology

Term	Description
Various	For terminology, see Programme Glossary on the MHHS portal:

2 Executive Summary

The Market-wide Half Hourly Settlement programme (MHHS), when completed, will contribute to a more cost-effective electricity system, encouraging more flexible use of energy and helping consumers lower their bills.

[REF-01] [MHHS-DEL315 - E2E Testing & Integration Strategy](#) describes the overall, end-to-end (E2E) approach to testing - the manner in which all parties involved in the MHHS programme will conduct testing. It spans initial testing of individual systems through to complete E2E tests ahead of the start of the Migration Period (where the new systems are progressively introduced and old systems progressively retired). The document describes the major phases of testing:

- **Pre-Integration Testing (PIT)**
- **Systems Integration Testing (SIT)**
- **User Integration Testing (UIT)**

The purpose of Systems Integration Testing (SIT) phase is to prove that the component Services are implemented in a way consistent with the MHHS E2E Design and interact in a coherent and consistent manner, in other words to “prove” the MHHS E2E Design. The SIT phase comprises of 5 sub-Test Stages:

- **Component Integration Testing (CIT)**, where all components of the MHHS E2E solution are integrated and tested for compliance with the interface specifications and codes of connection. This includes step-by-step integration of the DIP (including PKI), central systems, MPRS, Smart and Advanced Data Services, Metering Services, Suppliers, Network Operations, UMSSO services and UMSSDS.
- **Functional Test**, where together, the systems and their interfaces are tested E2E for compliance with the E2E MHHS Design, using pre-defined E2E business scenarios.
- **Migration Test**, where the migration process specified in the E2E MHHS Design is tested, starting with the “as is” systems and moving through the migration steps to arrive in the final “to be” state. Both central (market infrastructure) and supplier/service provider systems will be needed for Migration SIT.
- **Non-Functional Test**, where the non-functional characteristics (including performance and security requirements) specified in the E2E MHHS Design are tested.
- **Operational Test**, where the central systems’ operational functions and processes are tested (including their service management solutions and Business Continuity/Disaster Recovery). Supplier and service provider systems may be needed to support testing but will not themselves be under test.

The Programme has a defined set of documentation which will be produced to support the preparation and conduct of each SIT stage. This Approach and Plan document specifically relates to the Functional Test stage, describing the associated objectives, scope, approach, schedule, management, governance and assurance of the test stage. This is a child document of [REF-01] [MHHS-DEL315 - E2E Testing & Integration Strategy](#) and therefore it is recommended that for context both documents are read in conjunction.

3 Introduction

3.1 Document Purpose

The SIT Functional Test Approach and Plan (this document) sits within a two tier MHHS Test documentation hierarchy. Please note this document references tier 1 parent documents throughout and doesn't seek to repeat content contained within them, readers will be sign posted to these documents for further detail where relevant. This document also refers to tier 2 child documents that will be produced later.

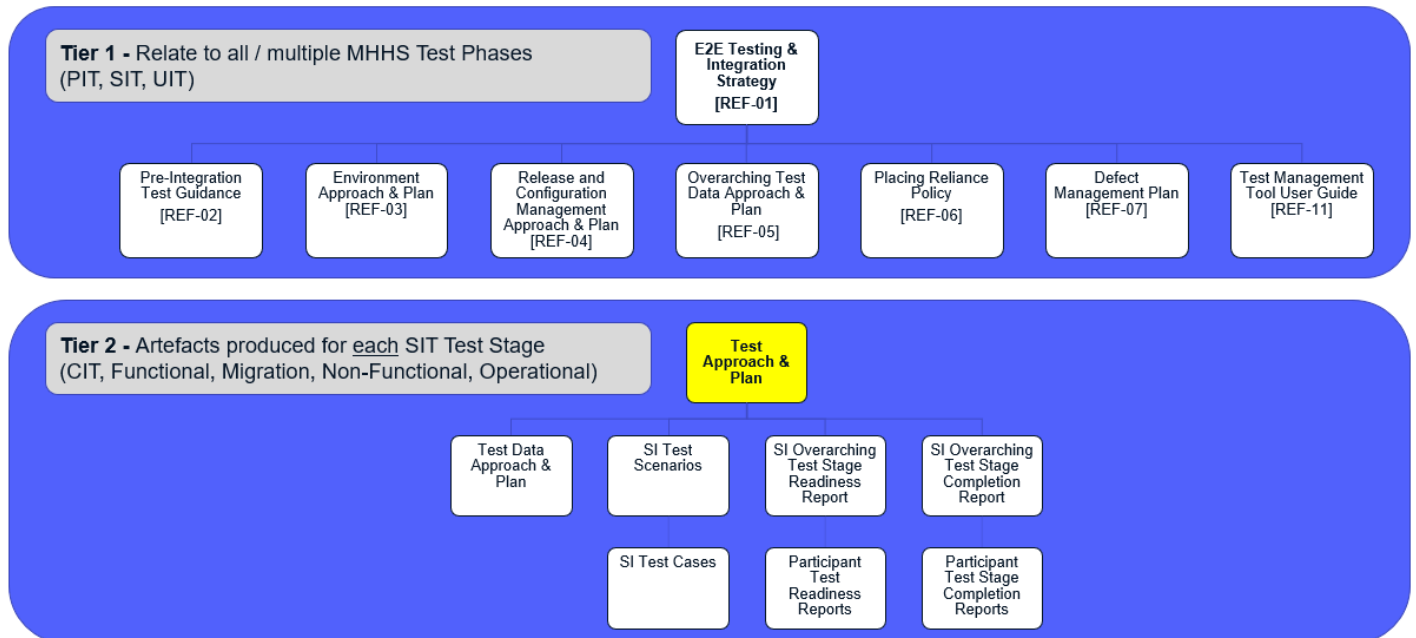


Figure 1 - MHHS two tier test documentation hierarchy

The Functional Test Approach and Plan covers.

- Test Stage Objectives
- Scope
- Architecture and Coverage
- Approach (Preparation & Execution), covering:
 - Test Scenarios and Cases
 - Test Data (to be read in conjunction with the SIT Functional Test Data Approach and Plan)
 - Stubs and Harnesses
 - Test Management Tool
 - Evidence Capture
 - Defects Management
 - Environments & Releases
 - Readiness and Completion Reports
 - Entry and Exit Criteria
- Schedules
- Management & Organisation
- Governance & Reporting
- Assurance.

This document is intended to be read by the following groups:

- SRO Function (SRO)
- Lead Delivery Partner (LDP)
- Testing and Migration Advisory Group (TMAG)
- All Programme party teams and resources involved in SIT execution or support.
- DCC UEPT Team
- BSC and REC Code Body Qualification teams
- Independent Programme Assurance (IPA).

3.2 Reviews and Approvals

The SIT Functional Test Approach and Plan will go through initial LDP review by the following team members:

- Lee Cox, SI Test Manager
- Kevin Davis, SI Test Architect
- Cesar Lopes, SI Data Architect
- Simon Berry, SI Environments and Release Manager

Upon completion of LDP review, any comments and feedback would be incorporated before going to the SRO team formal review by:

- Chan Dabare, SRO Function Programme Test Manager
- Smitha Pichrikat, SRO Function Client Delivery Manager
- Code Bodies (BSC and REC)

Upon completion of the SRO and Code Body review it will then be distributed to the SITWG for consultation, where comments will be incorporated leading to a recommendation for TMAG approval by the group.

Approval will then be requested from:

- Testing and Migration Advisory Group (TMAG).

The document will be made available for information via the programme portal.

3.3 Change Forecast

The SI team will own this document and keep it up to date, with review and approval by MHHS programme governance as appropriate. Each new version supersedes the previous version in its entirety.

At the time of writing the SIT Functional test scenarios and cases are still under development, once a greater degree of maturity has been reached on these artefacts, the test cases will be analysed in order to determine the priority of test cases and the sequence and timing by which they will most efficiently be executed during SIT functional testing, ultimately then informing the detailed test schedule for the test stage. These aspects will be socialised and developed in consultation with the System Integration Test Working Group (SITWG) and the agreed output then formalised in a new full version of this document that will be targeted for approval in the January 2024 TMAG.

All updates to this document will follow the review and approval process outlined in section 3.2.

3.4 Summary of Changes

Minor changes in version 0.4:

- Change in Section 5.1 Scope - 'Registration Services (MPRS)' has been changed to 'Registration Services (REGS)'.
- Change in Section 9.1 Test Meetings - addition of Code Body representation at weekly test meetings.

3.5 Assumptions and Caveats

3.5.1 Assumptions

Please refer to the [MHHS Collaboration Base](#) for the published RAID log.

3.5.2 Caveats

N/A.

4 Objectives

4.1 Objectives

The objective of the Functional Test stage is to validate the new MHHS arrangements by involving all Central Systems, the Registration Service and at least two Services for each other Role all connected via the Data Integration Platform (DIP) enabling End-to-end functional tests to be conducted, based on business scenarios to exercise and “prove” the MHHS E2E Design.

5 Scope

5.1 In Scope

MHHS Requirements, Business Processes, and the design in scope for SIT Functional Test can be found on the MHHS collaboration base [here](#).

The roles and Participants in scope for the SIT Functional Test stage are:

- Data Integration Platform (DIP)
- BSC Central Service (VAS, Settlement Operations, LSS, MDS)
- Registration Service (REGS)
- Smart Data Service (SDS)
- Advanced Data Service (ADS)
- Metering Service Smart (MSS)
- Metering Service Advanced (MSA)
- Electricity Suppliers
- Network Operations
- Electricity Enquiry Service (EES)
- Unmetered Supplies Operator (UMSO)
- Unmetered Supplies Data Service (UMSDS)

- DCC (DSP, CSS)
- Electralink (DTN).

Please note that this document is agnostic of specific industry SIT volunteer organisations.

The SIT Functional E2E Test scenarios in scope are grouped by functional areas below:

Functional Areas
Change of Supplier/Service
Change of Service Details
Customer contract
Existing MPAN, Chg Supplier/Service failure/edge
Existing MPAN, Chg Supplier/Service successful
Export MPAN
New MPAN, Chg Supplier/Service failure/edge
New MPAN, Chg Supplier/Service successful
Operational choreography
Consumption
Advisory Notification
Collection & Processing - failure/edge
Collection & Processing - successful
Estimation of consumption data
ISD
Editing ISD
Using ISD
Load Shapes
Load Shape calculation - failure/edge
Load Shape calculation - successful
MDS
Annual Consumption
DDE - failure/edge
DDE - successful
MDS calculation - failure/edge
MDS calculation - successful
Reporting
Metering Changes
Change of Market Segment/Connection Type
Change of meter
Disconnection
Energisation
Registration Data
Registration Data update - successful
Registration Service update - successful
Volume Allocation
DDE - successful
Reporting
VAS calculation - failure/edge
VAS calculation - successful
VAS configuration

Table 1 - SIT Functional Test Scenarios

Please refer to [REF-08] [MHHS-DEL1117 - SIT Functional Test Scenarios](#) for further detail of the SIT Functional scope and coverage.

5.2 Out of Scope

- DCC DSP UEPT – Participants adopting the SDS MDR role are to engage with the DCC and follow and complete the associated User Entry Process Test procedures as a pre-requisite to entering SIT Functional Test (Note this does not apply to suppliers fulfilling the MDR role using IS and ES IDs).
- The details and mechanics of how test data will be allocated and used during Functional Test will be the subject of the separate [REF-12] [MHHS-DEL1367 - SIT Functional Test Data Approach and Plan](#), this will be published in conjunction with this document.

- The pairing of SIT participants with contracted partners or otherwise for the purposes of testing will be determined via assessment of the SIT volunteer cohort eco-system, and subsequent monitoring and assurance of SIT volunteer readiness. This document assumes that this pairing will be established but will not be the vehicle for confirming the pairings, however it does identify this will need to be in place and confirmed ahead of test execution and so this has been included as an entry criteria in section 7.1.6.
- Pre-Integration Test (PIT), which takes place on the Programme participant's own standalone test environment and is a pre-requisite for entry into SIT or Qualification Testing. Guidance for this test phase can be found in [REF-02] [MHHS-DEL852 - Pre-Integration Test Guidance](#).
- All the other SIT Stages – these will be the subject of separate Test Approach and Plan documents:
 - Component Integration Test
 - Migration Test
 - Non-Functional Test
 - Operational Test
- UIT Test Stages:
 - Qualification Test
 - E2E Sandbox.

6 Test Architecture & Coverage

6.1 MHHS Architecture and Coverage

SIT Functional Test will be achieved by establishing a test environment where all Central Systems, the Registration Service and at least two Services for each Role are connected via to the Data Integration Platform (DIP), in addition to DCC (DSP and CSS) RECCo (EES) and Electralink (DTN). Note that SIT Participants will have proven DIP connectivity within the Component Integration Test stage, in addition they will be required to establish and prove non-DIP connectivity as a separate pre-requisite to SIT Functional Test, thus enabling a fully functioning MHHS ecosystem. Tests will then be conducted based on the test scenarios and cases in scope. It should be noted that metering components fall outside of the MHHS design scope, and for this reason consumption data generators will be used for the purposes of testing.

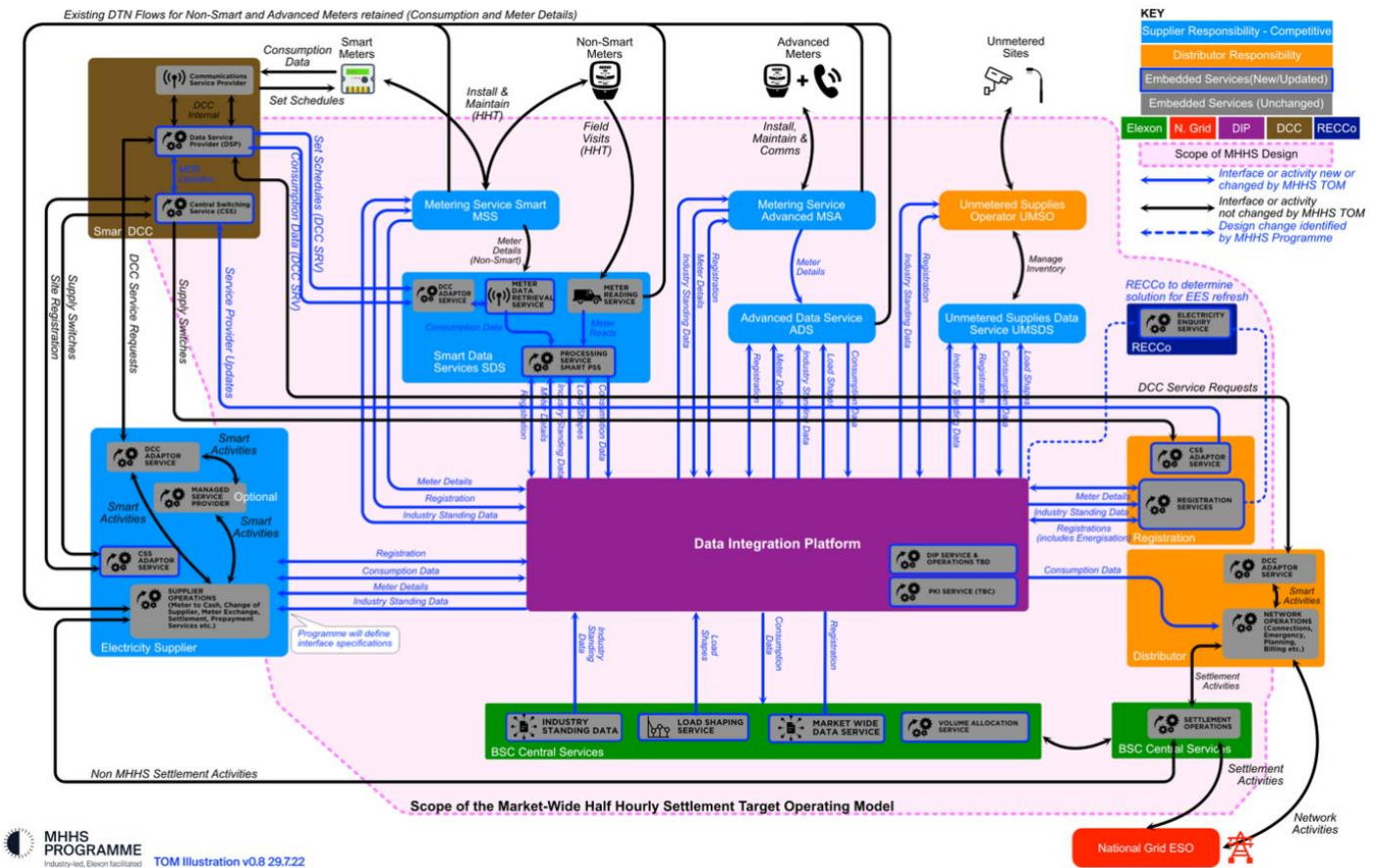


Figure 2 - TOM illustration

For details of the scenario coverage please refer to [REF-08] [MHHS-DEL1117 - SIT Functional Test Scenarios](#).

6.1.1 MHHS Environment Requirements

SIT Functional stage testing will be undertaken within the MHHS SIT-A environment. SIT Functional Test participants that interface directly with the DIP will have proven their connectivity to the DIP within the Component Integration Test stage, however will be required to prove the connectivity of their SIT-A test environments to all relevant non-DIP interfaces within the MHHS eco-system as a pre-requisite to SIT Functional Test, in addition to confirming readiness of their SIT-Staging environments in accordance with the requirements set out in [REF-03] [MHHS-DEL618 - Environment Approach & Plan](#), please refer to this document for the details on:

- Management and tracking environment builds, and associated reference data.

- Planning and allocation in the use of environments for relevant participants, including user access permissions and control.
- Environment Connectivity Proving.
- Maintenance, availability, and monitoring of environments, including the specification of back-ups, exports, refreshes, or roll backs.
- Controlling deployments into environments, including data configuration, version control and release notes.
- Tracking and coordination in resolving environment issues using the defect management workflow.
- Environment requirements for the various stages within PIT, SIT and UIT phases.

7 Test Approach

7.1 Test Preparation

7.1.1 SI Test Scenarios & Test Cases

The SI Test Team has used the MHHS Design repositories to inform MHHS test scenario and test case design. At the top level the design is structured into 3 key themes:

- MPAN Ownership
- Metering Changes
- Meter to Bank

The themes in turn link to business requirements, business process descriptions, interface specifications, logical data model, method statements and the End-to-End Solution Architecture. These documents help trace the business journey for each MHHS industry role across the process flow, the underlying systems, the associated message exchanges and validation rules.

Each participant role can be mapped to its' flows, in relation to each service, as well as interactions with other roles and participants (process handoffs). This is critical for analysing SIT end to end testing requirements.

SIT Functional Scenarios have been developed by the SI Test Team and undergo the following review, consultation and approval process:

1. LDP Peer Review.
2. SRO, Design Team and Code Body Review.
3. SITWG Review / Consultation.
4. TMAG Approval.

At the time of writing the SIT Functional Test Scenarios are at stage 3 of the process, for details please refer to [REF-08] [MHHS-DEL1117 - SIT Functional Test Scenarios](#). Test Cases are currently under development.

7.1.2 Test Data

[REF-05] [MHHS-DEL813 - Overarching Test Data Approach and Plan](#) describes how an aligned set of data for Systems Integration Testing (SIT) will be delivered. Please refer to this document for the details of the overall approach to data cuts, data management, allocation, cleansing, storage, archiving and maintenance.

Prior to SIT Functional Test commencement the SI will ensure all necessary data pre-requisites have been implemented and identify sets of suitable data and data generators that participants can use for each of their SIT test cases in scope. Details on process and mechanisms for this are to be documented in [REF-12] [MHHS-DEL1367 - SIT Functional Test Data Approach and Plan](#) which will be published in conjunction with this document.

7.1.3 Smart and Advanced Data Services

The MHHS design changes the process and calculation mechanisms for Half-Hourly data being provided via Smart and Advanced Data Services that produce IF021 outputs and the programme notes that the underlying method statement is a particularly complex area of the design. Due to the criticality of these components to settlement in the new arrangements, the programme intends to verify the accuracy of these new calculations through a mechanism of enhanced assurance, thus ensuring greater confidence in test results validation.

The possible mechanism for this enhanced assurance is currently under investigation by the programme and will be socialised via SIT working group in due course.

7.1.4 Test Management Tool

All SIT Functional Test execution and defects will be managed within the MHHS Azure DevOps (ADO) Test Management Tool.

In preparation for SIT Functional Test all test cases applicable to a participants' role in the test stage will be loaded into their individual ADO test project ready for execution.

7.1.4.1 Test Management Tool Onboarding

The SI will set up all nominated test resources for each SIT participant within ADO and provide the necessary access and user guidance tutorial material.

Details of ADO set up, onboarding and usage is published within [REF-11] [MHHS-DEL1332 - Test Management Tool User Guide](#).

7.1.5 Participant Preparation

In preparation for the SIT Functional Test stage, participants will be required to plan, execute and complete the following activities:

- Pre-Integration Testing relevant to the SIT Functional Test stage – please refer to the [REF-02] [MHHS-DEL852 - Pre-Integration Test Guidance](#).
- Environment Connectivity proving for any relevant non-DIP interfaces, and readiness of PPs' 'SIT-Staging environment - please refer to the [REF-03] [MHHS-DEL618 - Environment Approach & Plan](#)
- Test Data allocation has been loaded and verified – please refer to the [REF-05] [MHHS-DEL813 - Overarching Test Data Approach and Plan](#) and [REF-12] [MHHS-DEL1367 - SIT Functional Test Data Approach and Plan](#) which will be published in conjunction with this document.
- Participant users have been onboarded to the MHHS Test Management Tool - please note details on this process will be published within [REF-11] [MHHS-DEL1332 - Test Management Tool User Guide](#).
- Participants have confirmed they have resources with the requisite skills and system access to support the test stage execution and defect management process – note this will be subject to assurance.

7.1.5.1 Participant's adopting the Placing Reliance Policy

[REF-06] [MHHS-DEL1064 - Placing Reliance Policy](#) can be adopted where Qualifying SIT participants either:

- a) Intend to delegate some, or all, testing to a 3rd Party Software / IT provider, or;
- b) Intend to enter SIT as a group and delegate or place reliance within that group.

In either case it is the Qualifying SIT participants that are ultimately accountable for how their MHHS industry testing requirements have been met, but exactly how they choose to delegate day-to-day task management within test

preparation and execution to their delegated 3rd party testing providers, or within the SIT Group, may differ between participants. During test preparation the SI will provide a RACI template for participants to complete with their delegated 3rd Party test providers, which will confirm arrangements in relation to (but not limited to) the following areas:

- Test Meeting Attendance.
- Defect Decisions.
- Releases.
- Governance representation.

7.1.5.2 Participant SIT Test Readiness Report

Prior to Functional Test commencement each participant will be required to provide a Participant SIT Test Readiness Report as a self-declaration of their completion status in relation to preparation activities outlined in section 7.1.5, this will need to include any exceptions and work off plans that have been agreed and must be signed by senior stakeholders within the participants' organisation. Please note the SI will provide a report pro-forma for participants to complete.

The SI will be engaged in Test Assurance engagement and monitoring throughout these preparation activities; however, the report serves as a formal position at the point of SIT Functional Test entry governance.

Participant SIT Test Readiness Reports will be required at a defined date ahead of your SIT Functional Test commencement, please see section 8.2 for the schedule and dates by which this will be required for your role / service.

7.1.6 Test Entry Criteria

The following deliverables have been produced by the SI, reviewed, assured and approved as appropriate for the test stage:

- Test Approach and Plan.
- Test Data Approach and Plan.
- Test Scenarios.
- Test Cases.
- Requirements Traceability Matrix.
- Test execution schedule (SIT participants will be consulted).

The following have been set up and confirmed by the SI as ready for test commencement:

- Test data generators have been made available to relevant test participants.
- Test data has been allocated to participants.
- Test Management Tool
 - Participant ADO user access.
 - Test Management Tool Training material.
 - Tests have been loaded.
 - Tests have been assigned to relevant participants.
- SDS/ADS enhanced results assurance mechanism.
- SIT PP pairing confirmed.
- Test case priority (Code Bodies will be consulted), sequence, and execution schedule.
- Core regression tests have been identified.
- Defect Management process.
- Environment Management process.
- Release Management process.
- Test governance.
- Test meetings.
- Test Reporting.

For Participants entering SIT Functional Test:

- Evidence of successful PIT Completion for the SIT Functional Test stage has been submitted, assured by the SI and any work off plans agreed and tracked - please refer to [REF-02] [MHHS-DEL852 - Pre-Integration Test Guidance](#) for full details of the PIT exit criteria.
- Successful Completion of the SIT Component Integration Test stage has been assured by the SI and any work off plans agreed and tracked.
- Environment Connectivity proving for any relevant non-DIP interfaces has been successfully completed and evidence assured by the SI.
- SIT-Staging Environment has been confirmed as ready.
- Test Data allocation has been loaded, verified and assured by the SI.
- Participant users have been onboarded to the MHHS Test Management Tool.
- Participants have confirmed they have resources with the requisite skills and system access to support the test stage execution and defect management process.

- Participants that are adopting the [REF-06] [MHHS-DEL1064 – Placing Reliance Policy](#) in SIT have a confirmed RACI.

7.1.6.1 *SI Test Readiness Report*

Prior to SIT Functional Test entry the SI will compile an overarching SIT Functional Test Readiness report on the status of these entry criteria, which will note any exceptions or work off plans that have been agreed and include the SI recommendation to proceed or pause. This report will form the basis on which governance approval to commence SIT Functional Test execution will be sought via the MHHS Governance Framework – please see section 10.1.

7.2 Test Execution

Test execution will be conducted within a three-cycle approach:

- **Cycle 1** – during the early stages of this cycle the aim will be prove the E2E cohesiveness of the solution by exercising all hand-off points as soon as possible. Testing will then progress in a logical sequence, considering both test case priority and the most efficient and logical sequence where scenarios executed are able to produce the pre-conditions for downstream process scenarios. The aim will be to exercise as much of the test coverage as possible in cycle 1 to flush out all key defects.
- **Cycles 2 and 3** – will be used to address any defect retesting or tests that were unable to completed within the previous cycle(s), in addition to any associated regression testing identified as required due to code releases.
- **Regression Test** (see section 7.2.7).

During test execution the SI Test Team will coordinate and support the execution in particular where hand offs of test cases are required between participants.

Prior to testing SIT volunteer participants will have been paired with contracted partners where possible or other participants in order to support Change of Supply / Service / Agent tests.

It should be noted that as a condition of participation each SIT PP will be required and obligated to support other participants' testing, so a participant should look at the tests for all Roles and be prepared to support those tests where involvement is needed to ensure the test can be run in an end-to-end manner. For core capability providers (Elexon (Helix), DIP, LDSOs / (St Clements), RECCo, DCC, ElectraLink) this will be up until the end of SIT testing, some none-core capability PPs may be required to continue involvement beyond the completion of their own tests so as to maintain a minimum viable cohort for the purpose of supporting the remaining participants to complete their SIT testing.

7.2.1.1 *Minimum Viable Cohort*

Since the purpose of SIT is to prove the MHHS E2E design, the SIT objective is achieved when a group representing the Central Systems and all BSC and REC governed MHHS roles has completed the necessary testing, we have called this group the **Minimum Viable Cohort** and its members will be identified early in SIT Functional Test according to the speed at which they are completing their tests.

The MVC will consist of:

- **All providers of Central Systems** (DIP, Elexon, DCC, RECCo, Electralink)
- **One of each of St. Clements** (MPRS), **i/DNOs** (UMSO and Network Operations Services)
- **At least two Service Providers** for each of the following market roles:
 - Metering Services Smart (MSS)
 - Metering Services Advanced (MSA)
 - Smart Data Services (SDS)
 - Advanced Data Services (ADS)
 - Unmetered Supply Data Services (UMSDS)
- **Two Suppliers** (Change of Supply (CoS)).

Note the MVC will be the first set of participants to qualify and Go-live at M10.

All participants will be encouraged to keep pace with the MVC during SIT, as once formed, the objectives of this cohort will be prioritised in order to exercise the MHHS solution and meet the overall SIT objectives as soon as possible. However, SIT participants not in the MVC will be supported through SIT and will be provided additional time to complete their testing (see section 8.1), as such some MVC participants may be asked to continue to support SIT execution in the later stages to maintain a sufficient MHHS cohort to complete all SIT PP tests.

7.2.1.2 Test Prioritisation

Test prioritisation will be carried out according to:

- The need for the test to demonstrate basic functionality as a prelude to more complex testing or during the step-by-step integration of components.
- The risk inherent in the functionality being tested.

Tests for basic functionality will be written and executed first and then the risk assessment will be used to prioritise test preparation and test execution activities for the remaining tests. For the risk-based prioritisation, each test will be prioritised by the relevant stakeholders in terms of its market impact (i.e., if the solution element covered by the test failed in live use, what would be the impact on the solution) and technical probability (i.e., how likely is it that test issues will be present in the solution element). This prioritisation will use a High, Medium, Low scale in order to group tests into three categories:

1. tests which cover solution elements that a) are very likely to contain test issues and/or b) would cause major market impact if they failed.
2. tests which cover solution elements that a) are likely to contain test issues and/or b) would cause significant market impact if they failed.
3. tests which cover solution elements that a) are unlikely to contain test issues and/or b) would cause only minor market impact if they failed.

Please note consideration will also be given to tests that are required in order to “prove” the overall design i.e. MVC vs. tests that don’t fall into this category but are required for individual participants to meet their Qualification requirements.

7.2.1.3 Test Pass and Fail

A test will pass if the actual result matches the expected result. Where this is not the case, a defect will be raised.

If the subsequent triage process determines that the defect has been raised in error (e.g. due to a misunderstanding), if the test can then be concluded successfully the test will be reset from “fail” to “pass”.

There is also the possibility of marking a test “descoped” by agreement of all parties concerned and on recording of a valid reason.

Where a test has failed, but during triage a workaround for the associated defect has been identified, which in turn reduces the severity of that defect, the associated failed test can be re-executed using the recommended workaround, if this enables the test to be concluded successfully then the test can be set to “passed with workaround(s)”. Special attention will be given to any tests that have been set to this status during execution, and where a full fix becomes available during the SIT test stage the test will be scheduled for re-testing. If any tests remain in this state at the end of testing, then they will be clearly marked in the test completion report and agreement sought by all concerned parties that this acceptable for go-live and that an agreed work off plan is in place.

Under some circumstances tests will be marked as “blocked” if they were due to be executed in the schedule but are unable to be due to a known defect. This status will be used appropriately where it assists in informing management stakeholders of the impact of open defects on testing progress or completion.

Some tests may be set to “deferred” if it has been agreed by all concerned parties that they will be executed in a later cycle, release or test phase.

7.2.2 Test Data Usage

Each SIT Functional Test participant will be allocated a set of suitable test data for each test case in scope for their role. All MPANs records used in testing will be allocated a unique reference ID that will be used in all communications including test result and defect logging in ADO.

Full details of how test data will be generated and managed during test execution are to be documented in [REF-12] [MHHS-DEL1367 - SIT Functional Test Data Approach and Plan](#) which will be published in conjunction with this document.

7.2.3 ADO

ADO will be used for:

- Managing test case execution, hand-offs between SIT Participants and evidence capture.
- Tracking and reporting test execution progress and coverage.
- Raising and managing defects (including Environment issues).
- Tracking and reporting defect status and progress.
- Release Management.
- Maintaining requirements to test traceability.
- Tracking and reporting test coverage status.

SIT participants will be expected to keep ADO updated in real time as execution is carried out.

Details of the ADO set up are published within [REF-11] [MHHS-DEL1332 - Test Management Tool User Guide](#).

7.2.3.1 Test Evidence Capture

Programme participants conducting SIT Functional Test will need to provide test evidence for the test steps in ADO where it has been indicated as required, note that this will be expected to be captured and uploaded into ADO at the point of test execution, or no later than the end of the business day, any exceptions to this timing of evidence upload will need to be specifically agreed with the SI. This evidence will be used during test assurance to validate actual vs. expected result of the test. In addition, test evidence will be critical for triaging defects, and this may require both the evidence of the failure event, and upstream test step evidence to assist in analysing the failure.

Screenshots of the test system, messages and or electronic logs of messages must be provided as appropriate and should be annotated with the Test Case reference and test step that they apply to. The evidence requested is standard for any test assurance process and should be similar to that required by the Programme participants' own quality gate and internal audit.

7.2.4 Placing Reliance

Where applicable, day-to-day test execution will be managed and coordinated in accordance with the Placing Reliance RACI that has been agreed during preparation with those participants that have chosen to adopt the policy to meet their test requirement.

Please note that if during test execution a SIT Participant wishes to execute testing differently to what was agreed in their SIT Placing Reliance proposals (please see [REF-06] [MHHS-DEL1064 - Placing Reliance Policy](#) for details), then they must notify both the Programme and Code Bodies, and if deemed necessary this may require them to meet additional SIT-exit or Qualification requirements.

7.2.5 Defect Management

The MHHS programme defines a defect, in respect of any tests, as:

- a) Anything that is preventing the execution of the tests; or
- b) Once commenced or executed, the test has an unexpected or unexplained outcome or response.

A defect is raised in respect of any of the following:

- Failure in the way systems (or system components) operate (both functionally and non-functionally).
- Failure in the way systems have been integrated and/or communications between these systems.
- Failure in the performance of test emulators, simulators or data generators.
- Failure in relation to different Test environments.
- Failure in relation to the Test specifications, cases, data or expected results.
- Documentation Issue.

All defects will be raised and managed within MHHS Test Management Tool (ADO) and will follow the process depicted below.

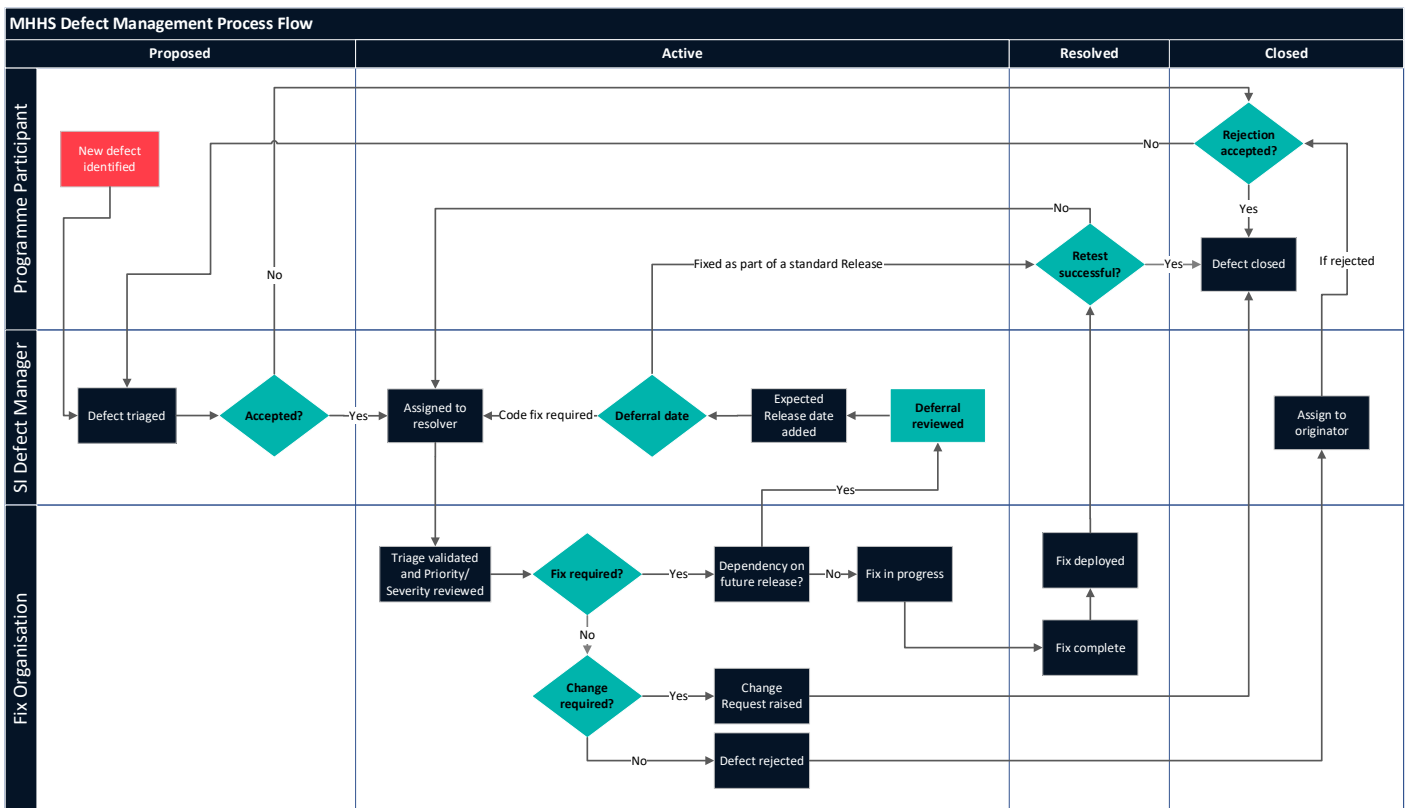


Figure 3 - ADO Defect Process Flow

Defects arising within the SIT Functional Test stage will be managed in accordance with the [REF-07] MHHS-DEL466 - Defect Management Plan.

7.2.6 Release & Configuration Management

When defects arise that require a code fix, code releases will be managed in accordance with the [REF-04] MHHS-DEL1089 - Release and Configuration Management Approach & Plan.

During the assessment of any release, the appropriate level of retesting and regression will be identified, and the schedule amended to accommodate the changes.

Each participant will be expected to maintain a test environment for the purposes of testing releases ahead of deployment into the SIT-A environment (this will be a PIT type environment managed in the participants' own

network domain). A condition of release deployment will be evidence of release testing and regression testing having been undertaken which will be reviewed by the SI test assurance team.

7.2.7 Regression Testing

Test cases will be identified as candidates for a core regression pack during test preparation.

During SIT functional test cycle execution, regression testing requirements will be assessed throughout on a case-by-case basis in relation to any defects that have been fixed with a code release, including assessment of the impact the release may have on testing that had been previously executed within the test stage.

The degree of regression risk that has been identified during cycle testing may influence the composition of tests included in subsequent test cycles.

When MHHS MVC test coverage has been achieved in SIT Functional Testing, a 'Core Systems Code Freeze' will then be implemented, after which a final regression test cycle will be executed by the MVC participants to ensure confidence in the MHHS solution prior to SIT PP migration, and commencement of the UIT Qualification Testing phase. The composition of tests in scope for this regression test cycle will be a combination of core regression tests and any additional test coverage in areas which may have deemed to have been impacted by code releases.

7.2.8 Test Suspension and Resumption Criteria

During SIT, any PP has the right to suspend testing where it considers necessary, by agreement with the SI team. Testing will only recommence when agreed between the PP and SI team. Where the SI team believes there are reasonable grounds to suspend all testing, this can be done by agreement with the SRO. In the case of any suspension the IPA and OFGEM would also be informed.

Reasonable grounds for suspending testing may include any of the following:

- Application components are not available as scheduled.
- A testing issue prevents further useful testing from proceeding.
- A large percentage of planned test cases for a given day fail and significant root cause analysis needs to be undertaken to establish the cause. The outcome of any root cause analysis activity may result in testing being suspended; or
- Test cases to be executed are in a "blocked" status due to an identified testing issue.

Where testing has been suspended, either the SI team or the PP (as appropriate) will produce a test suspension report reflecting the cause of the suspension and the actions to be taken by whom and when in order for testing to resume – the test resumption criteria. Testing will only resume once the PP has demonstrated to the SI team or the SI team to the SRO that the test resumption criteria have been met.

7.2.9 Participant Test Completion Reports

As each SIT participant concludes their testing within the SIT Functional Test stage, they will be required to provide an individual Test Completion Report, this will need to include any exceptions and work off plans that have been agreed.

Please note the SI will provide the test completion report format for all participants to complete, the expectation is that participants will provide test completion reports within 5 working days of when they have completed their stage testing.

The SI will be engaged in Test Assurance engagement and monitoring throughout the execution activities; however, the report serves as a formal position at the point of SIT Functional Test exit governance.

7.2.10 Test Exit Criteria

- All tests have been run to completion or any exceptions are documented and agreed.
- All priority 1 and 2 tests have passed, and the overall test pass rate is 85% or above or any exceptions are documented and agreed.
- There are no outstanding severity 1 or 2 defects, or any exceptions are documented and agreed.
- The number of outstanding severity 3-5 defects on each system and the total number of severity 3-5 defects across all systems are documented and agreed.
- Work-off plan for any outstanding defects has been produced and agreed.
- Test results and evidence has been captured in the test management tool.
- Defects have been captured in the defect management tool.
- Any required regression testing has been successfully completed.

7.2.10.1 SI Test Completion Report

At the end of the SIT Functional Test for both the 'MVC' and 'Other SIT PP' cohorts, the SI will produce an overarching test stage completion report which will cover:

- Test Execution Results (Anonymised as appropriate i.e., identified by market role rather than organisation).
- Summary of Test Status (Planned vs. Actual).
- Passed with Workarounds (If applicable).
- Failed Tests (If applicable).
- Descoped or Deferred Tests (If applicable).
- Status of work off plan from previous phase / stage (If applicable).
- Defects Summary (Anonymised as appropriate i.e., identified by market role rather than organisation).
- Raised and closed (Inc closure reason analysis).
- Outstanding Defects with their status and work off plan.
- Outstanding Defects (By Priority and Severity).
- Outstanding Defects (By Test Participant - identified by market role rather than organisation).
- Defects Analysis (Anonymised as appropriate i.e., identified by market role rather than organisation)
 - By Category.
 - By Closure Reason.
- Defect Lessons Learned and Improvement Plans for the next phase / stage.
- Test Exit
 - Exit Criteria Status.
 - Work Off Plan (Note Code Bodies will be consulted in ref to role-based Qualification requirements).
- Overall Test Execution Observations, Lessons Learned and Improvement Plans for the next phase / stage (If applicable).
- Conclusion and Recommendation.

This report will form the basis on which governance approval of the completion of the SIT Functional Test stage for both the 'MVC' and 'Other SIT PP' cohorts will be sought via the MHHS Programme Governance Framework – please see section 10.1.

8 Test Schedule

8.1 SIT Functional Test

SIT Functional Test is the 2nd stage within the System Integration Test schedule.

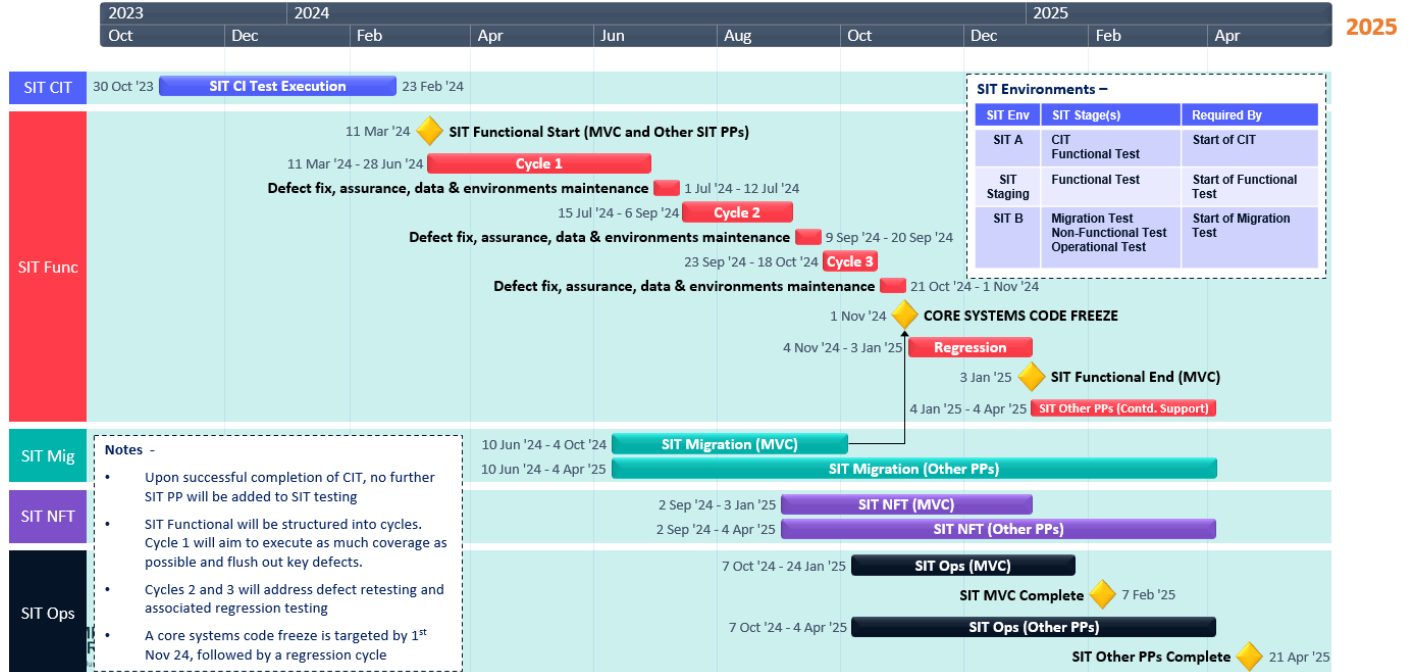


Figure 4 - SIT Stages Plan on a Page

8.2 SIT Functional Test Preparation Schedule

8.2.1 SIT Functional Test Participant Preparation Schedule

SIT Functional readiness dates that all PP's will be required to meet ahead of test execution commencement can be found below. Please note that this also includes the schedule for test assurance and governance activities. It is recommended that participants refer to [REF-13] [MHHS-DEL1139 - MHHS Outline Plan](#) as the primary up to date source to confirm MHHS programme tasks and dates.

For details of activities, deliverables and assurance associated to PIT please refer to [REF-02] [MHHS-DEL852 - Pre-Integration Test Guidance](#).

All SIT PPs

Activity / Milestone	Notes	Completion / Milestone Date
SIT Functional Testing Start	TMAG Milestone	11th Mar 24
SIT Functional Test Preparation Complete	TMAG Milestone	1 st Mar 24
SI Overarching SIT Functional Test Readiness Report reviewed by SITWG / IPA	5 working days for review	23 rd Feb 24
SI Issues Overarching SIT Functional Test Readiness Report		16 th Feb 24
PP SIT Functional Test Readiness Reports Assured by SI	5 working days for review	16 th Feb 24
PPs Issue SIT Functional Test Readiness Reports		9 th Feb 24
Test Data Load and Verification Complete	Period of 4 weeks prior to PP Functional Test Readiness Report	9 th Feb 24
MHHS Functional Test code deployed to SIT PPs' envs	Period of 2 weeks prior to PP Functional Test Readiness Report	9 th Feb 24
SIT PPs' SIT-Staging Environment Ready		9 th Feb 24
SIT PPs' SIT-A env non-DIP interface Environment Connectivity Proving Complete		9 th Feb 24
SIT PPs' SIT-A env ready to start non-DIP interface connectivity proving		16 th Jan 24
PP Final Functional PIT Completion Reports assured by SI	5 working days for review	16 th Feb 24
PPs Issue Final Functional PIT Completion Report	Final report allowing for any test completion delta	9 th Feb 24 (No later than**)
Draft Functional PIT Completion Reports assured by SI		9 th Feb 24
PPs Issue Draft Functional PIT Completion Report	A draft of the PIT test completion report to be submitted no later than 15 working days before the planned end of test execution	19 th Jan 24 (No later than**)

Figure 5 – SIT Functional Test Readiness Schedule

8.3 Test Execution Schedule

Please see Section 3.3.

9 Test Management & Organisation

The following resources will be required to prepare and execute the SIT Functional Test stage. The resources below is a guideline to the types of resource required by organisations participating in the day-to-day activities of Functional Test. It is the responsibility of each Participant to provide sufficient and appropriate resources to support the Test Stage.

Organisation	Role/Resource Type
SIT Participants	<ul style="list-style-type: none"> • Test Manager • Test Analyst • Defect Manager / Analyst • Programme Management • Infrastructure, application and network support • Release and configuration management support • Environment Management support

SI Team

- Test Manager
 - Test Lead / Analyst(s)
 - Test Data Lead / Analyst(s)
 - Defect Manager / Analyst(s)
 - Programme Management
 - Environment Manager
 - Release Manager
 - Test Architect / Assurance Manager
 - Test Assurance Lead / Analyst(s)
 - Test Management Tool Lead / Analyst(s)
-

Table 2 - Test Teams & Roles

9.1 Test Meetings

Daily Test Meetings

During Test Execution, the SI will hold regular stand-up meetings with each individual test Participant (and / or their delegated 3rd Party testing provider) to:

- Review the status of testing for the previous day.
- Review planned testing for the day.
- Review any changes required to scheduled testing e.g. for blocking Defects.

Where appropriate both the Participant and other party representatives who are engaged in testing together at the time may be invited into joint stand-ups where there is requirement to discuss and coordinate on cross party activities or blockers.

The SI may also invite SME's both from within the central programme or from SIT Participant organisations to discuss specific topics concerning defects, environmental or data issues or releases.

Weekly Test Execution Progress Meetings

The SI will conduct weekly Test Progress meetings with all test participants engaged in testing at that point in the schedule, to:

- Collaborate with all Test Participants on matters relating to Test Execution
- Review testing progress for the week to date.
- Review planned testing for the following week.
- Review any changes required to scheduled testing e.g. for blocking Defects.

This meeting will also involve representatives from the Environments, Data, Defect Resolution, Release Management and Code Bodies.

Note that the default period for reporting will be from Friday to Thursday to allow for collation and distribution of reports. The meeting will be conducted using Microsoft Teams.

Defect Management Meetings

Please refer to the [\[REF-07\] MHHS-DEL466 - Defect Management Plan](#).

Environments and Release Management Meetings

Please refer to:

- [REF-03] [MHHS-DEL618 - Environment Approach & Plan.](#)
- [REF-04] [MHHS-DEL1089 - Release and Configuration Management Approach & Plan.](#)

Fast Track Implementation Group

The SI will provide status updates within the FTIG forum and escalate any blocking issues which may need collaboration at this forum in order to resolve.

9.2 Test Roles & Responsibilities

9.2.1 SIT Functional Test RACI

Activity	Participant	SI	SI Test Assurance	Code Bodies	SITWG	TMAG
SIT Functional Test Scenarios	I	R,A	C	C	C	I
SIT Functional Test Scenarios Approval	I	C	C	C	C	R,A
SIT Functional Test Cases	I	R,A	C	C	C	I
SIT Functional Test Cases Approval	I	C	C	C	C	R,A
SIT Functional Test Approach and Plan	I	R,A	C	C	C	I
SIT Functional Test Approach and Plan Approval	I	C	C	C	C	R,A
Set up and administration of Test Management Tool (ADO)	I	R,A	C	I	I	I
Set up of Participant users within (ADO)	I	R,A	C	I	I	I
Test Data Allocation	C	R,A	C	I	C	I
Loading and assigning of Test Cases in ADO	I	R,A	I	I	I	I
PIT Preparation, Execution and Completion	R,A	C	I	I	I	I
Coordination of Environment Connectivity Proving	C	R,A	I	I	I	I
Environment Connectivity Proving	R,A	C	I	I	I	I
Test Data Load and Verification	R,A	C	I	I	I	I
Participant mobilisation of appropriate Test and Support Resources	R,A	C	I	I	I	I
Participant SIT Functional Test Readiness Report	R,A	C	I	I	I	I

SI SIT Functional Test Case Prioritisation	I	R,A	C	C	C	I
SIT Functional Test Execution Sequence and Schedule	I	R,A	C	I	C	I
SI SIT Functional Test Readiness Report	C	R,A	C	I	I	I
SI SIT Functional Test Readiness Report Approval	I	C	C	I	C	R,A
Decision to commence SIT Functional Test Execution	I	C	C	I	C	R,A
Completion of assigned SIT Functional Test Case Execution within ADO (inc. evidence capture)	R,A	C	I	I	I	I
SIT Functional Test Case Execution Coordination and Support	C	R,A	I	I	I	I
Defect Management Coordination	C	R,A	I	I	I	I
Fixing assigned Defects (inc. Environment Defects)	R,A	C	I	I	I	I
Coordinating Releases & Code Deployments	C	R,A	I	I	I	I
Deployment of Releases	R,A	C	I	I	I	I
Chairing Test Meetings	C	R,A	I	I	I	I
Participant Test Meeting Attendance	R,A	C	I	I	I	I
Reporting on Overall Test Execution and Completion Progress and RAG status	C	R,A	C	I	I	I
Participant SIT Functional Test Completion Report	R,A	C	I	I	I	I
SI Participant Test Completion Assurance	C,A	C	R	I	I	I
SI SIT Functional Test Completion Report	C	R,A	C	C	I	I
SI SIT Functional Test Completion Report Approval	I	C	C	C	C	R,A

Table 3 – SIT Functional Test RACI (R = Responsible, A = Accountable, C = Consulted, I = Informed)

10 Test Governance & Reporting

10.1 Governance

SIT Functional Testing will operate in accordance with [REF-09] MHHS-DEL030 - Programme Governance Framework adhering to the decision making and escalation principles set out within.

The table below is an extract from the [REF-10] MHHS-DEL1140 - Milestone Register identifying SIT Functional Test milestones and the decision-making authority (governance group). The SI will be responsible for reporting status and RAG for all Tier 2 and 3 TMAG milestones.

Milestone Tier	Level 1 Milestone	Milestone ID	Milestone Title	Decision-making authority (governance group)
T3		T3-TE-0015	SIT Functional Testing Test scenarios approved	TMAG
T3		T3-TE-0013	SIT Functional Testing Test Approach & Plan approved	TMAG
T3		T3-TE-0070	SIT Functional Testing Test Cases approved	TMAG
T2		T2-TE-0550	SIT Functional Testing Preparation Complete	TMAG
T3		T3-TE-0034	SIT Functional Testing Start	TMAG
T3		T3-TE-0045	Core Systems Code Freeze	TMAG
T3		T3-TE-0046	SIT Functional Testing End (Minimum Viable Cohort) (incl. confirmation that PPs have submitted their Test Completion Reports to Programme for assurance)	TMAG
T2		T2-TE-0850	SIT Functional Testing Test Completion Report (Minimum Viable Cohort) Approved	TMAG
T3		T3-TE-0052	SIT Functional Testing End (Other Participants) (incl. confirmation that PPs have submitted their Test Completion Reports to Programme for assurance)	TMAG
T3		T3-TE-0055	SIT Functional Testing Test Completion Report (Other Participants) Approved	TMAG

Table 4 – SIT Functional Test Milestones

10.2 Reporting

Once test execution for the test stage has started, the responsible party will ensure that test execution progress is kept up to date in ADO and tracked within configurable ADO dashboards (See below for an ADO dashboard example). The SI team will then produce regular aggregate progress reports based on this information. The reports will be collated by the SI team for use within Test progress, Defect Management and Release Meetings and for upward reporting to the SRO, FTIG, SITWG and TMAG. Reports are configurable but will generally show:

- Actual number of test cases executed vs. planned, cumulative trend.

- Actual number of test cases passed vs. planned, cumulative trend.
- Actual number of open and closed test defects vs. cumulative trend.
- Actual number of test defects outstanding, split by severity / priority.
- Test and requirement coverage by priority.
- Test and requirement coverage across MVC and all SIT Participants.
- Progress against test exit criteria.
- Progress against any work-off plan from previous test stage.
- Risk, dependency and assumption status.
- Overall RAG status.

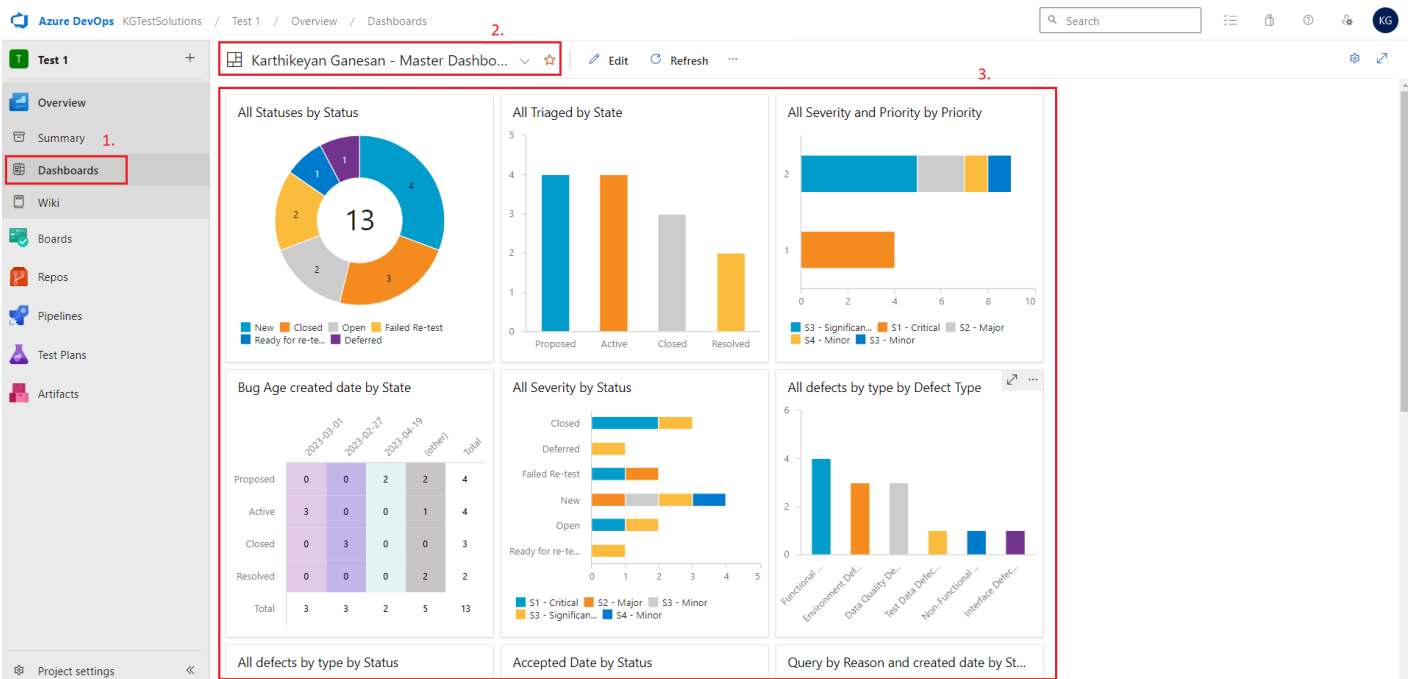


Figure 6 - ADO Dashboards

11 Test Assurance

11.1 Approach

SI Team will carry out monitoring and outcome assurance throughout PIT, details of this approach can be found within the [REF-02] [MHHS-DEL852 - Pre-Integration Test Guidance](#).

In addition to this SI will engage in assurance of Programme participant SIT readiness activities i.e.

- Environments.
- Test Data.
- Test and Support Resource mobilisation.
- Test Resource readiness for execution.

During and following SIT Functional Test execution the SI will undertake assurance of test execution results with a specific focus on:

- Validating evidence of actual vs. expected results of tests.

- The quality of supporting information and evidence within defects.
 - Evidence of local defect retesting prior to fix release deployment to the SIT-A environment.
 - Test Stage Exit Criteria and Completion Status.
-

12 Appendix

N/A