SCOTTISH FUTURES TRUST

Construction Quality Improvement Collaborative

A Guide for Developing a Client Construction Quality Plan

SCOTTISH FUTURES TRUST

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Executive Summary

Over the last 5 years there have been significant, well publicised, failures of quality on a number of projects including Edinburgh Schools, DG One Leisure Centre, NW Campus and Queen Elizabeth University Hospital. Each of those projects was subject of an independent inquiry into the failings. Those charged with the delivery of these projects did not set out to fail, but it is evident from the reports that they did not articulate, or implement, a plan for success. The cost of failure, in terms of quality, is a subject covered extensively by the Get It Right Initiative (GIRI). GIRI's research suggests that the direct cost of avoidable error is in the order of 5% of project value. Their research has revealed that the true figure is closer to 21% or £21 billion per annum across the UK. Access to their work is available **here**.

By adopting a culture where everyone feels motivated to play a positive role in delivering sustainable construction quality, this will support Scotland's net zero carbon goals. Getting work right avoids additional waste and produces buildings which will perform, in terms of energy use, as intended.

It is essential that achievement of the required **quality** is given as much prominence in the management of the project as **health & safety, cost and time.** As with those aspects of the project, there needs to be a plan developed and agreed on how quality will be achieved. The plan needs to explain how work will be proactively managed to achieve quality and not depend on reactively responding to failures in quality.

This guide provides support to contracting authorities as they look to develop a project quality plan and also create the conditions for success.

1. Introduction

This document provides a guide to the development, management, and effective application of quality plans across the project Life Cycle. This guide is in response to the Construction Quality Improvement Collaborative (CQIC).

The Construction Quality Improvement Collaborative (CQIC) is an initiative involving Scottish Government, SFT, other public sector contributors and representative bodies across the construction industry (including Construction Scotland, RIAS and RICS) with the overall vision of "**creating a sustainable quality culture across construction by 2025".**

All too often efforts to drive quality start when a project commences on site. It is essential that the approach to quality is a feature of a project from the outset.

The CQIC is taking a holistic approach and has identified four key drivers of quality achievement for all stages.

- Alignment – all parts of the system, including procurement and design, contributing to the delivery of quality compliance.
- Competence, roles and responsibilities – the need for all contributors to be clear about their roles and responsibilities and competent to deliver them.
- Behaviours – creation of the conditions that embed a "right first time" culture at all levels and at all stages.
- Quality assurance and control – implementation of appropriate management controls and systems to ensure that the right resources are in place and the right decisions are taken at the right time.

The CQIC is continuing to develop and will provide guidance, notes on good practice and case studies to support the achievement of quality. These will be made available on the CQIC website once the initiative is formally launched.

The Scottish Government's Construction Phase Handbook, which provides guidance to assist public sector Clients manage and procure construction projects, has a chapter which is dedicated to the requirements for, and approach to, quality. Access to the Chapter 3 – Quality in the Construction Phase Handbook is available **here**.

What is Quality?

The Handbook referred to above defines quality as follows –

The successful delivery of a construction project depends on many, sometimes competing, factors coming together. Quality is one such factor and an important one. Quality is objective not subjective and must be measurable against a defined standard. It must not be mistaken for a simple aesthetic, a shinier finish or more expensive components. It is a combination of a number of aspects and can be defined as follows:

> *Quality has two elements to it. Firstly, it is about defining a specification which meets the functional and operational requirements of the use and users of the built asset and, secondly, it is about delivery in all respects of that specification through its design, procurement and construction.*

Figure 1.

Delivery of the specification in itself will comprise a number of aspects of the project and the following schematic describes the key elements which, when they are all present and correct *in all respects,* will mean a quality output has been achieved.

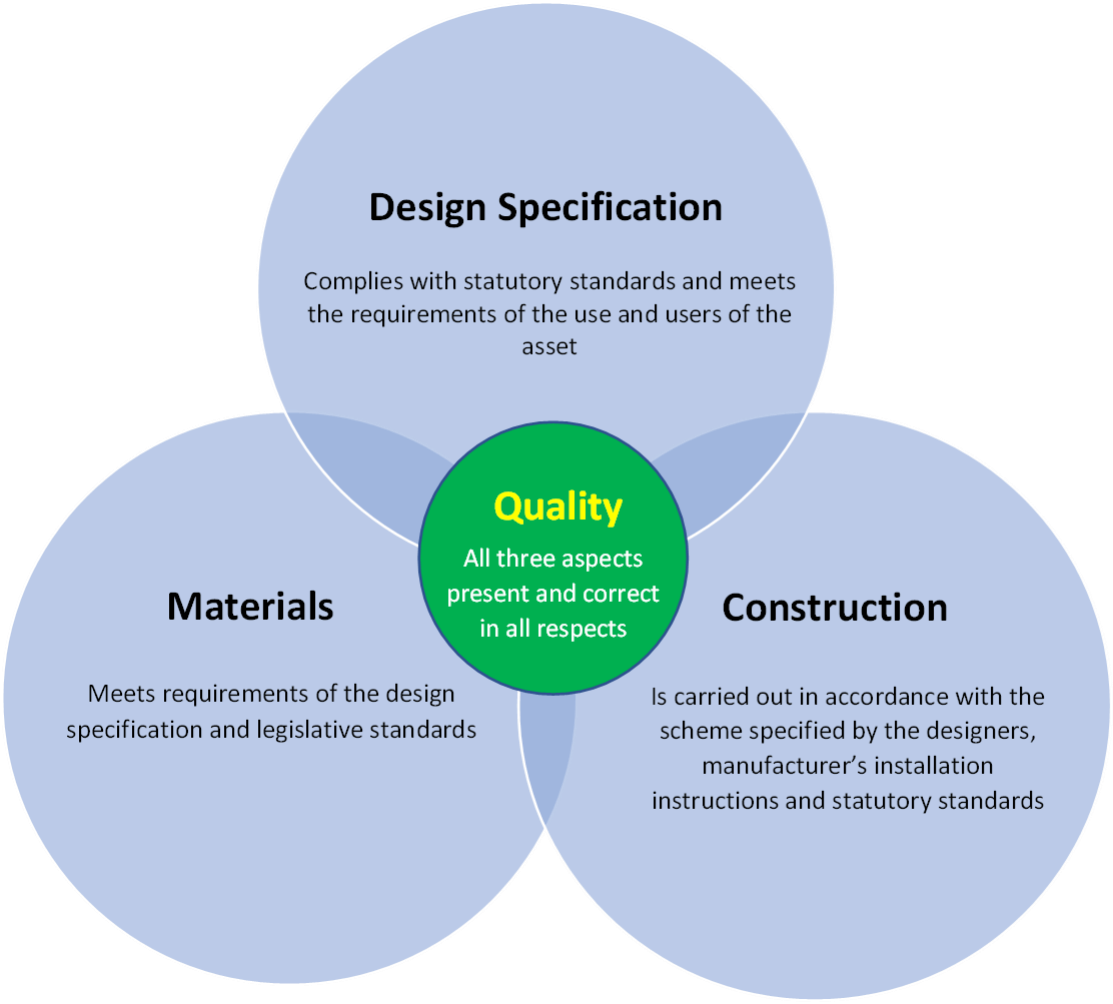

Figure 2.

Acceptable quality will not be delivered where there is un-remediated deviation from the specification. Therefore, there must be procedures in place to ensure its delivery and deal with any deviation from the specification. Remediation may include correcting the deviation or redefining the specification. This applies to each of the three requirements:

- **Design.** If the design does not meet the statutory and functional requirements of the use and users of the building, acceptable quality is not present.
- **Materials.** If the materials are not ordered, supplied and/or received according to the design specification or manufacturer's standard as set out in the contract, acceptable quality is not present.
- **Construction.** If construction is not in accordance with any or all of the design specification, manufacturer's instructions and statutory requirements, acceptable quality is not present.

There must be a continual review on behalf of the Client by personnel with the requisite skills, expertise and experience of each aspect to ensure that the requirements are being met. This review must be routine as well as in response to planned or 'accidental' deviations. Each aspect should not be viewed in isolation. A change in one is likely to have a knock-on impact on another. Therefore, a change prompted by a planned deviation during, for example, construction must be reviewed against that phase but also against the outputs of the design and materials aspects and any remedial action taken.

The delivery of quality, as described above in *Figure 2*, is a non-negotiable. Contractors and consultants are obliged to deliver it according to their contracts. The contract must set out what is required to deliver the output. The specification should define exactly what is required, no more no less; if more is required then the specification must be amended to reflect that.

Although the contractor is contractually obliged to deliver the specification, the Client cannot simply sit back and leave it all to the contractor. They must be proactive in ensuring and assuring that an effective quality management system is in place and being followed regardless of whether the procurement strategy and associated contract documentation places the majority of the risk with the contractor. This requires a collaborative approach led by the Client.

Effective communication is essential, and this starts with the Client ensuring that everyone involved in the project whether part of the Client team, the consultants or the contractors and their sub-contractors, is clear about what is required of them both individually and collectively as a team. This will be done through a number of documents including the business case, personal job descriptions and contracts as well as being reinforced during meetings.

Procedures must be put in place to deal with issues relating to deviations from the quality standard set out in the specification. Remedial action to address such deviations must be taken and can include action to either correct the deviation or review whether the design specification requires to be redefined.

The delivery of all the Client contributions to quality described in the above definition need to be set out at the start of a project. This guide provides support to deliver best practice quality plans that can document, support and embed a quality culture and practice within projects to deliver improved outcomes. A quality plan alone will not deliver success and it is the behaviours and collective ownership of quality across all project stakeholders that will improve quality across the project lifecycle.

2. Creating Conditions for Success

2.1. Alignment to process

All parts of the process must be designed and implemented to drive quality and improve performance. This requires that:–

- Policy and guidance are aligned across the sector
- Project delivery systems, including procurement, are aligned
- Everyone has access to the right information at the right time

2.2. Competency roles & responsibilities

All contributors are clear about their roles and responsibilities and are competent to deliver them.

- We have the appropriate project leadership and management in place
- Our culture encourages everyone to accept responsibility for delivering quality
- Everyone has the right skills, experience, and qualifications to do a quality job
- We are committed to developing people

2.3. Behaviours

To create the conditions that embed a positive 'right first time' culture at all stages and by all those involved in the project.

- Leadership demonstrates a commitment to delivering the CQIC vision and values
- All personnel are engaged and create a positive working environment with the right conditions for realising change

2.4. Quality Assurance & Control

To do it right first time – at the right time

- Processes are in place to ensure compliance and to prevent errors
- Mechanisms are in place to detect and address any variations to agreed standards
- Appropriate project resources are available for programme, design, materials, skills and budget

2.5. Technology and Information Management

The use of technology can significantly support the delivery of quality. Technology and the management of information are seen as a key mechanism for the public sector to secure improved performance in how they plan, invest, deliver and manage their infrastructure. The use of BIM, information management systems, photo-capture and other technologies need to be considered at an early stage in the project process. Adding them at a later stage can mean that the project is not set up to make use of the technology, appointments do not include use of them or that the costs are not included in the overall budget. Information on the use of technology is available in the Infrastructure Technology Navigator **Here.**

Effective management of information is a key aspect of achieving and demonstrating the achievement of quality. In the case of the Learning Estate Investment Programme (LEIP), it is a requirement that the use of a Standard Information Management Plan (SIMP) approach is implemented. Information on SIMP is available **Here**.

2.6. How to measure success

Measurement of the impact and success of the approach to quality can be challenging. It is not unusual for quality to be judged by how many items there are on a snagging list as at the due date for Completion. A high number of items on the list at this stage tends to suggest that the works are not to the required quality and perhaps are not yet complete. Equally, a small number of items at Completion may be due to expending a significant amount of time and resources in the latter stages of the construction to put right work which was not done properly in the first place. The measurement of the success of a proactive approach to the delivery of quality during the construction stage needs to take into consideration the following factors:–

- How many issues or non-conformances are being recorded as the work progresses?
- How significant are these issues – a measure may be the time, resources and materials that are required to remedy the issues.
- Do you have confidence in the records that are being kept of the issues that are being raised?
- How expediently and efficiently are issues that are raised being remedied? Are they being reported as outstanding over a significant or sustained period?
- Are the same issues being repeated or have lessons been learned from early incidents and has preventative action been taken to avoid repetition?
- Is there evidence of good collaboration, openness and transparency between your team, the design team and the contractor and between the contractor and the supply chain?
- Even though there are a relatively small number of snagging items at Completion, is there a longer list of items being raised, and which need to be remedied, once the facility is in use?

To truly measure the impact of a pro-active approach to quality it is important that a thorough lessons learned session takes place at the end of each key stage of the project. As well as identifying what went wrong, and what must be done better on future projects, it must also consider what went well and how this can be assuredly replicated on future projects.

Analysis can be done of the records kept of issues that have been recorded as snags or defects either during the execution of the works or once the facility is in operation. This can give an insight into the extent of failures of quality. As was noted above, the Get It Right Initiative research suggests that the basic cost of such failures is at least 5% of project value. They note that the true cost of the impact of failures in quality is much higher. It should be noted that analysis of the records is not something that is done as a matter of course. The records of snags and defects are generally used as a checklist of what needs rectified and what has been rectified. The data is seldom used to proactively assess the extent or nature of problems which have arisen. Such an approach would have to be a specific requirement, and this would have to be included in the contract.

3. The Delivery of the Project Quality Plan

3.1. Introduction

Implementation of a Project Quality Plan

The development of a quality plan within a project should address all stages in the delivery process including briefing, design, procurement, construction, and handover. It needs to be developed as a part of the project initiation and kept up to date as the project progresses. The quality plan should set out an agenda for action and cultural change and not just be a document to evidence the process for assessing quality within a project. The plan should set out: -

- Ethos and project vision for quality
- Aligned quality process for project delivery process
- Roles & responsibilities
- Cultural change and behaviours
- Quality Control Process
- Document the requirements by stage
- Consider the role of technology to support quality.

Section 5.5 of this guide provides suggested considerations and themes to be addressed when preparing and developing a project quality plan. It is not a template for the quality plan but details the issues that need to be considered and incorporated in a plan which is setting out to proactively manage and achieve the required quality. It should emphasise the ethos of quality that must be adopted. By doing so it will support cultural change, and behavioural change, beyond a checklist and assure that the project delivers high quality product and outcomes.

The Quality Cycle

Figure 3

3.2. The value of the Project Quality Plan

Quality does not happen by accident! In the majority of instances, a reasonable standard of quality is achieved, and the outcome is deemed satisfactory, even without a clear quality plan. This is normally due to the knowledge, experience, expertise and efforts of those involved. However, without a clearly thought-out quality plan there is a much higher chance that quality will not be achieved, and circumstances will intervene to cause a failure of quality. That plan needs to be written down and shared so that all parties have a common understanding of the approach to assuring quality is achieved.

3.3. When should it start?

The earlier that a quality plan is produced, the better. Ideally by RIBA Stage 1. This will be a Client task.

This plan should not be confused with the Contractor's Quality Plan. The Contractor's plan will describe how they are going to manage quality for those aspects of the project which they can manage and control. It will not cover how the authority is going to fulfil their role in proactively managing quality. How the Client organisation will specify the requirement for a Contractor's Quality Plan, receive and review it, should be included in the Client's Quality Plan.

It is worth noting the work of the Construction Quality Assurance Initiative (CQAI) which worked with a selection of pilot projects to consider how a proactive approach, with an increased focus on quality, might be developed and implemented for the projects during the on-site stage. Information on the CQAI, and the approaches implemented, is available **here**.

3.4. Who is Responsible for the Quality Plan?

The key step change in the creation and management of a quality plan is the need to ensure the quality plan is led, managed and delivered by the Client organisation. The supply chain will support the development and may supplement the quality plan but not have overall responsibility.

A decision has to be made on the right resources to deliver the plan within the Client organisation. Although it may be necessary to have an external resource to draft, or support drafting, of the plan, it is essential that it reflects the Client's intended approach and that they take ownership of the plan and its implementation. The articulation of the approach to quality, and the production of a Quality Plan, can be a daunting prospect. However, it is likely that many of the areas which will be included in a Quality Plan are already done by Clients. They are just not articulated in a written plan. Detailed below is a list of suggested topics and questions that Clients will wish to consider in the development of their Quality Plan.

3.5. What should be considered and documented?

This section outlines some key questions and considerations for addressing within a project Quality Plan.

Project Vision and Ethos for Quality

1. What is the project vision and ethos for quality and how will this be communicated to stakeholders and supply chain members?
2. What ways will the requirements for, and approach to delivering, quality be communicated to project members – e.g. appointments, initial inductions to the project, site inductions, project review meetings etc.

Governance, Roles and Responsibilities

3. Are the roles and responsibilities of all the key parties on the project clearly defined? Who is involved and how do they link together?

4. Has the Baseline Skillset Toolkit been used for those leading the project? Click **here** for more information on the Baseline Skillset Toolkit.

5. What are the governance and project structures? How will they support the definition and achievement of quality?

6. Is there an identified role which includes being a champion for quality? This might not be a separate appointment but is someone within the senior management of the project identified as a focal point for the drive to achieve the required quality. They should show leadership towards delivering the required quality. They will not be solely responsible for the delivery of quality but should have knowledge and experience of how quality is achieved, what the risks to quality are and be prepared to intervene, and where necessary escalate matters, where they perceive that the approaches being taken, or behaviours being displayed, are putting quality at risk.

7. How will the approach to quality and associated monitoring be embedded within the overall project assurance process? An example would be that the Project Board receives a regular report on quality matters.

8. Do all stakeholders understand the principles of quality of design and construction being sought, and do they have a collective ambition for the project?

Information Management and Technology

9. How will the information management approach and process support the quality process?

10. Will the Client organisation ask for access to the constructor's quality management software? This was a successful approach taken on the CQAI pilot projects and is very beneficial to the Client's team. It provides openness and transparency on how quality is being managed and a shared insight into the extent of snagging and non-conformance. Has the requirement been, or will it be, highlighted during the procurement process? What records of quality achievement will be required to be maintained during construction and provided as part of the project documentation at handover?

11. Is a photo-capture technology or progression scanning technology to be used during the construction process? Is it allowed for in the project budget? Information on the use of technology is available from the Tech Navigator which is accessible **here**.

12. Will there be use of technology such as a Common Data Environment? If so, how will it be used?

Briefing & Procurement

13. How will the lessons learned, specifically on construction quality, from previous projects be captured to inform an improved approach to quality? This might include consultations, post project reviews and post occupancy evaluations and engagement with operational teams. This is with reference to lessons learned with regards to the whole process. Elements of the in-use lessons learned may be covered by the Briefing and Evaluation process. Information on Briefing and Evaluation is available **here**.

14. How will the brief be developed and reviewed to ensure it captures the expectations in terms of quality?

15. How will the project budget and programme be established to allow sufficient resources (of funds and time) in design and construction, to allow the required quality to be achieved?

16. How will procurement take the delivery of quality into account (for all aspects – design and construction)? It is important that delivery of quality is a key criterion in the selection of consultants and contractors. There must be clarity that a contractor's Quality Plan will be required that explains the approaches they will take to getting the work right and not just how they will fix snags. Separate guidance to good approaches for quality during construction is being prepared.

Design & Construction

17. How will designs be reviewed and the risks to their compliance aligning to the Client's project requirements addressed? Does the Client have an internal resource to support this or will external support be required?

18. Who will review the contractor's quality plan? Have the requirements for the provision of the contractor's quality plan been clearly set out? Guidance for approaches to achieving quality during the construction stage will be provided as a part of the CQIC. How will the implementation of the designer and/or contractor's Quality Plan be monitored during the execution of the project? Will compliance audits be carried out in addition to physical inspections of completed works?

19. Is there a design responsibility matrix? How will Contractor's Design Portion (CDP) elements be dealt with? Who will review the CDPs for compliance with the overall design?

20. What is the process for independent quality assurance during the construction phase? Is it a Clerk of Works, Inspector or Technical Advisor? How much time will be dedicated to the project? Again, separate guidance on the use of Independent Quality Assurance will be produced as a part of the CQIC and will be made available. Will a separate M & E Clerk of Works/Inspector be provided? If there is off-site fabrication or assembly how will this be covered? Are the costs of the resources required included in the budget? How will the role be formalised and how will the resulting reports be dealt with?

21. Will there be dedicated Quality Meetings during both the design and construction stages – i.e. not just an agenda item on Design Meetings or Progress Meetings? These can make a significant contribution to the pro-active management of quality. During the design and procurement stages these would cover how the lessons learned are being designed in or dealt with and review how the design is enabling quality. In the package procurement stage, it could cover how this process is affecting the ability to deliver to the required quality. Is there discussion taking place with the supply chain to get their expertise, experience and input? During the construction stage, quality meetings cover the actions being taken to get the work right in the first place, not just what snagging has been found. There needs to be a look ahead to forthcoming work and consideration of what risks to quality can be identified. What is being done to avert such risk? This can include sample panels, benchmarking of work, workshops to discuss the quality risks, toolbox talks with operatives etc. If snags are reported, then what is being done to avoid them happening again? Will the requirement for attendance at Quality Meetings be included in appointments and contracts?

22. What are the expectations/requirements in terms of the design team involvement during the construction stage? Is it allowed for, and a requirement, in the appointments?

23. Change control for design & construction – how will this be done and how will it address the potential risks/impact on quality?

Commissioning and Handover

24. Who will maintain the completed facility? How will the project effectively engage with and transition the facility to the FM/Property Team? Is it intended to use a "soft landings" type approach?

25. Is a digital operation and maintenance manual being specified and how will the quality of this information be validated?

In Operation

26. Post Project Reviews (PPR) and Post Occupancy Evaluation (POE) are key aspects of the process. The requirement for them needs to be highlighted in the quality plan and included in

appointments and contracts. The lessons learned, both positive and negative, will be invaluable for future projects.

Other Considerations

27. Are any project level initiatives or awareness raising activities to be delivered to support cultural change amongst stakeholders in support of the delivery of construction quality – workshops, communications etc.

The list of questions above are not exhaustive and early engagement with the project team should be carried out to develop a proportionate, project specific quality approach.

Appendix 1 – Table of Links to Supporting Advice

Referenced in the body of this guide -

Page	Title	Link
2	Get It Right Initiative	https://getitright.uk.com/reports
3	Scottish Government Construction Phase Handbook - Chapter 3 - Quality	https://www.gov.scot/publications/construction-phase-handbook/pages/3/#page-top
6	Infrastructure Technology Navigator	https://infratech.scottishfuturestrust.org.uk/
6	Standard Information Management Plan (SIMP)	https://bimportal.scottishfuturestrust.org.uk/level1/stage/8/task/64
8	Baseline Skillset Toolkit	https://www.scottishfuturestrust.org.uk/publications/search?q=baseline+skillset
9	Construction Quality Assurance Initiative	https://www.scottishfuturestrust.org.uk/storage/uploads/constructionqualityassuranceinitiativepdf.pdf
9	Benefits and Evaluation Framework	https://www.scottishfuturestrust.org.uk/storage/uploads/sftframework18052021.pdf

Other advice and guidance -

Description	Link
CIOB Improving Quality in Construction	https://www.ciob.org/industry/politics-government/campaigns/construction-quality-commission?gclid=CjwKCAiA24SPBhB0EiwAjBgkhp8eJvccoMeR_9Rlh0vaEmt1ex-Rw9qT9AFTYeGTCWyn3oqywQFEQRoCLOoQAvD_BwE

Appendix 2 – Case Studies

Case studies of projects which have adopted effective and proactive management of quality will be provided at a later date. These will be on the CQIC website.

Appendix 3 – Template Contents List for a Quality Plan

A potential contents page for a Quality Plan might be –

Contents

1. Project Scope

2. Project Governance

3. Roles and Responsibilities

4. Quality Management Approach

4.1 Developing the Brief

4.2 Procurement

4.3 Design Stage

4.4 Construction Stage

4.5 Operational Stage

4.6 Meetings Structure

4.7 Change Control

5. Information Management and Technology

6. Communications Plan