

Lessons learned from one of New Zealand's most challenging civil engineering projects: rebuilding the earthquake damaged pipes, roads, bridges and retaining walls in the city of Christchurch 2011 - 2016.

Early involvement builds successful framework

Story: Early Constructor Involvement (ECI)

Theme: Programme Management

A document which discusses the importance of the ECI process at SCIRT.

This document has been provided as an example of a tool that might be useful for other organisations undertaking complex disaster recovery or infrastructure rebuild programmes.

For more information about this document, visit www.scirtlearninglegacy.org.nz



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Early involvement builds successful framework

Early constructor involvement (ECI) delivered maximum value through collaboration as SCIRT rebuilt the horizontal infrastructure of Christchurch.



By design: Utilising contractors during project design has delivered multiple benefits.

ECI centred on early engagement between multiple parties – asset owners, designers and constructors – covering scope, cost-effective outcomes and best practice and maximum value processes.

By improving transparency, reducing risk and sharing responsibility, ECI powered productivity gains and cut costs. It helped ensure efficient design and planning via a more effectual approach, resulting in a streamlined work process.

Providing “constructability” advice to designers; being involved in project risk assessment and management; and evaluating the project methodology and schedule to inform the project design, target out-turn cost (TOC) development and planning were all part of the ECI collaborative delivery process.

At every stage, ECI highlighted a “best for project” approach, including the contractor at the point where the most value could be extracted.

ECI measured risk mitigation while securing value for money. It provided constructor input during the design phase, ensuring issues and potential risks were identified and rectified. It played a major role in

achieving a positive outcome for the SCIRT programme of work. Earlier involvement in preliminary designs provided transparency on project costs and improved decision-making outcomes while ensuring control over deliverables. TOC estimates were reduced and a collaborative relationship was formed.

Several pre-construction processes relied on information provided via the design process.

In working with the designers, the Delivery Team could minimise the time lag between design completion and the start of construction as a result of the advanced planning through early involvement.

Concept design

Each Delivery Team had a dedicated ECI manager who worked with the Design Teams to provide constructability input to ensure risks were identified and taken into account.

When a project was allocated to a SCIRT Delivery Team, the ECI lead, in collaboration with the design lead, launched the ECI process, collating any necessary information prior to a concept design workshop.

Regular meetings and workshops were led by the ECI manager, who also monitored key project dates.

Concept design milestones requiring ECI input included:

1. Design initiation workshop
2. Risk workshop

Deliverables provided by the ECI Team during concept design included:

1. Outline construction schedule
2. Outline construction methodology
3. Resource assessment

ECI opened the door to improved cost certainty by significantly informing the estimate process.

4. Interface assessment (utilities providers, non-owner participants and stakeholders engaged when required)
5. Preliminary traffic staging plan (traffic management teams)
6. Environmental assessment (specialist input)

Detailed design

Detailed design included:

1. Design risk workshop
2. Constructability workshop
3. Handover meeting

During the detailed design process, ECI deliverables were further developed to provide:

1. Integrated construction methodology, including consideration of –
 - Site specific health and safety management
 - Environmental protection
 - Community and stakeholder communications
 - Resource and procurement requirements
 - Temporary works required
2. Detailed construction schedule
3. Traffic staging plan
4. Inspection and test plan (agreed with the designer)
5. Review and incorporation of construction risks into project risk register

6. Review and proposed temporary works items for project BoQ

Depending on the complexity of the project, other possible outputs included consent applications, environmental assessment, easements, surveys, and plant acquisition.

At the end of the detailed design phase, the ECI deliverables were made available to the SCIRT Integrated Services Team (IST) estimator, who derived the TOC using first principles costing.

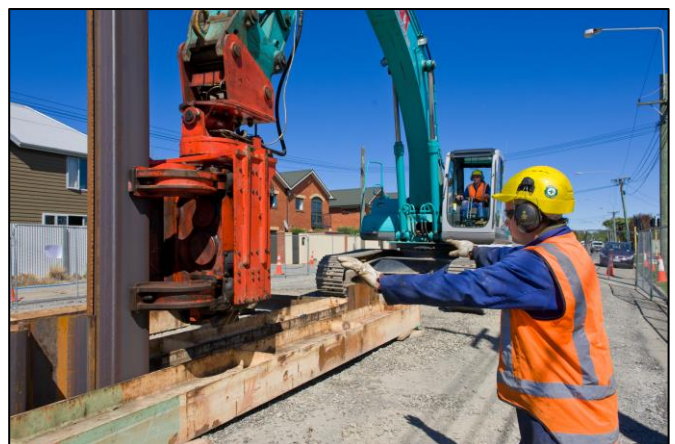
The ECI manager also reviewed the bill of quantities (BoQ), which was prepared by designers, to check the bill reflected the true scope and matched the intended methodology.

There was a fine line between providing information and influencing the TOC. For that reason, the estimators were empowered to select alternative methodologies for pricing purposes, if a net benefit could be demonstrated.

Educated estimate

When the deliverables and documentation were submitted, the ECI manager and a SCIRT estimator held a handover meeting to provide any clarifications required.

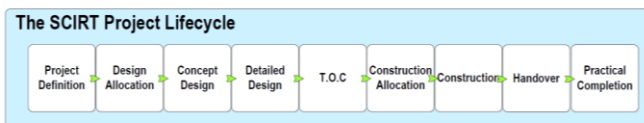
Methodology, the project schedule and any potential risks were fully considered. However, pricing remained off limits to ensure the independence of the TOC.



Safe and sound: ECI plays a role in reducing design and construction risk.

With all the information in hand, IST estimators developed the TOC for review by an independent estimator, who had prepared a parallel estimate.

ECI provided the Delivery Teams with improved early planning and better understanding. When a project was formally allocated to a Delivery Team, it could hit the ground running.



Ongoing progress: The nine SCIRT "gates".

Working through the SCIRT gates process, ECI played a major role at gates three and four while providing some input at gate five. The project allocation for construction (gate six) followed the setting of the TOC. Construction allocation was a competitive process based on performance and so ECI input at the design stage did not guarantee the same Delivery Team would

be allocated the project work.

Although about 85 per cent of projects were allocated to the same team, ECI Teams were, effectively, providing input to project design and TOC on behalf of all Delivery Teams.

The ECI process provided huge opportunities to provide value that would have been lost or diminished if constructors were not involved until after the design was completed and the TOC established.

It was difficult to quantify the added value because ECI input was provided before the first detailed project estimate (TOC) was prepared.

However, in the opinion of SCIRT executive general manager Ian Campbell, effective ECI was essential to the success of SCIRT.

Overall, ECI opened the door to improved cost certainty on each project by significantly informing the estimate process. ECI involvement brought clarity, transparency and maximum value while heading off potential risks.



Rock and hold: ECI has been an important element in rock stabilisation projects in Mount Pleasant.