SCIRT Rebuilding Infrastructure

LEARNING LEGACY

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.

# Environmental Initiative: Triumphal Arch major column seismic clamps

**Story:** Bridge of Remembrance and Memorial Arch

**Theme:** Construction

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A document describing Downer's use of column seismic clamps to prevent additional damage to the Arch columns.

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

Programme funded by
Christchurch City Council
New Zealand Government



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city care
Downer
Fulton Hogan
McConnell Dowell
Fletcher

ZERO HARM

DATE: 24/02/2015

ENVIRONMENTAL INITIATIVE

# Triumphal Arch- Major Column Seismic Clamps

MDF Mock Up Clamp

Visible Cracking in South Major Column

Seismic Clamp Installation

Seismic Clamp Installed

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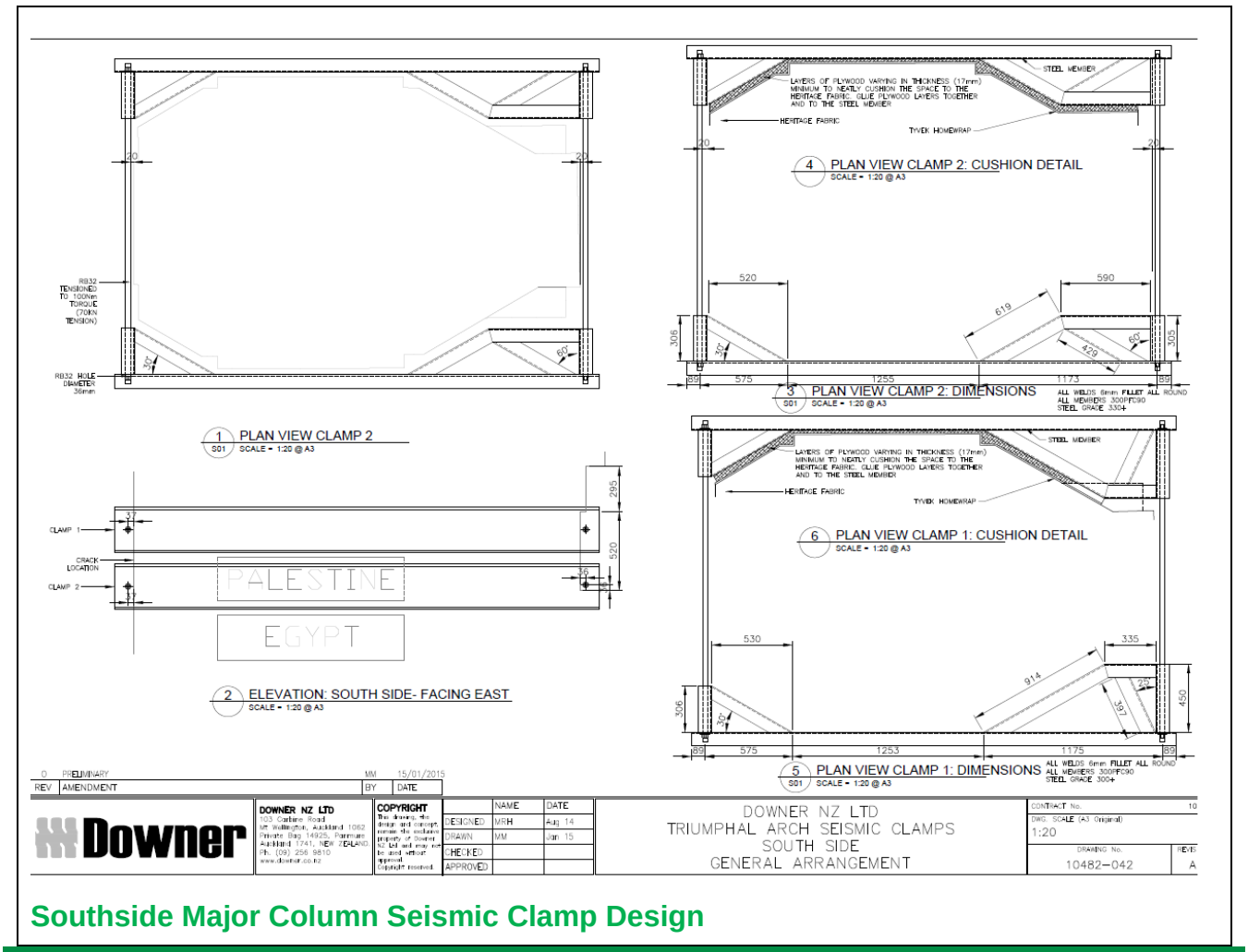
ZERO HARM

DATE: 24/02/2015

# ENVIRONMENTAL INITIATIVE




## Southside Major Column Seismic Clamp Design

## What is the initiative?

Seismic clamps for the Major Columns of the Triumphal Arch. This initiative prevents rocking and cracking of the heritage building in the event of an earthquake. This initiative addresses the critical risk of damaging a heritage structure.

The collars hold together the arch columns and prevent damage to the structure in the event of an earthquake. The initial design was cut from plywood to make sure all measurements were correct, from that design Lyttleton engineering were contracted to make the final product. The clamps are made from steel and have a foam covering to protect the columns when installing and tightening the clamps. The clamps are tightened to a specific torque specified by the structural engineer to provide support during earthquakes.

## How was it identified?

A collaborative effort in design which originates from site and the temporary works team. This is a unique design commissioned by the team. In order to make sure the structure was not further damaged the team at the Bridge of Remembrance decided to go beyond standard practice and

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implement a device that would not fail in the event of an earthquake

## Benefits

- Prevents further damage to the Arch columns
- Going beyond standard practice to protect a heritage building.
- Non-invasive to the heritage building.
- Cost effective compared to the cost it would take to reinstate the columns if they were to collapse during an earthquake.
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| **For further information contact** | Chris Gareze, Site Engineer | **Phone** | |
| **Authorised by** | Dathan Proudlove, Enviro Coordinator | **Phone** | |

**Discuss at next available pre-start meeting / post on notice boards (valid for 3 months)**